

SEQUENCE LISTING

<110> Yocum, R. et al.

<120> MICROORGANISMS AND ASSAYS FOR THE IDENTIFICATION OF
ANTIBIOTICS

<130> OGZ-001

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<150> US 60/227,860

<151> 2000-08-24

<160> 76

<170> PatentIn Ver. 2.0

<210> 1

<211> 777

<212> DNA

<213> Bacillus subtilis

<220>

<221> CDS

<222> (1)..(774)

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cat	aaa	aca	gaa	gat	gag	ttt	ggg	atg	att	ttg	cgc	tcc	tta	ttt	gat	144
His	Lys	Thr	Glu	Asp	Glu	Phe	Gly	Met	Ile	Leu	Arg	Ser	Leu	Phe	Asp	
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cac	tcc	ggg	ctt	atg	ttt	gaa	cag	ata	gat	ggc	att	att	att	tgc	tca	192
His	Ser	Gly	Leu	Met	Phe	Glu	Gln	Ile	Asp	Gly	Ile	Ile	Ile	Ser	Ser	
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gta	gtg	ccg	cca	atc	atg	ttt	gcg	tta	gaa	aga	atg	tgc	aca	aaa	tac	240
Val	Val	Pro	Pro	Ile	Met	Phe	Ala	Leu	Glu	Arg	Met	Cys	Thr	Lys	Tyr	
65					70					75					80	

ttt	cat	atc	gag	cct	caa	att	gtt	ggt	cca	ggt	atg	aaa	acc	ggt	tta	288
Phe	His	Ile	Glu	Pro	Gln	Ile	Val	Gly	Pro	Gly	Met	Lys	Thr	Gly	Leu	
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Asn	Ile	Lys	Tyr	Asp	Asn	Pro	Lys	Glu	Val	Gly	Ala	Asp	Arg	Ile	Val	
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Asn	Ala	Val	Ala	Ala	Ile	His	Leu	Tyr	Gly	Asn	Pro	Leu	Ile	Val	Val	
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gat	ttc	gga	acc	gcc	aca	acg	tac	tgc	tat	att	gat	gaa	aac	aaa	caa	432
Asp	Phe	Gly	Thr	Ala	Thr	Thr	Tyr	Cys	Tyr	Ile	Asp	Glu	Asn	Lys	Gln	
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Tyr	Met	Gly	Gly	Ala	Ile	Ala	Pro	Gly	Ile	Thr	Ile	Ser	Thr	Glu	Ala	
145					150					155					160	
ctt	tac	tcg	cgt	gca	gca	aag	ctt	cct	cgt	atc	gaa	atc	acc	cgg	ccc	528
Leu	Tyr	Ser	Arg	Ala	Ala	Lys	Leu	Pro	Arg	Ile	Glu	Ile	Thr	Arg	Pro	
				165					170					175		
gac	aat	att	atc	gga	aaa	aac	act	gtt	agc	gcg	atg	caa	tct	gga	att	576
Asp	Asn	Ile	Ile	Gly	Lys	Asn	Thr	Val	Ser	Ala	Met	Gln	Ser	Gly	Ile	
			180					185					190			
tta	ttt	ggc	tat	gtc	ggc	caa	gtg	gaa	gga	atc	gtt	aag	cga	atg	aaa	624
Leu	Phe	Gly	Tyr	Val	Gly	Gln	Val	Glu	Gly	Ile	Val	Lys	Arg	Met	Lys	
		195					200					205				
tgg	cag	gca	aaa	cag	gac	ctc	aag	gtc	att	gcg	aca	gga	ggc	ctg	gcg	672
Trp	Gln	Ala	Lys	Gln	Asp	Leu	Lys	Val	Ile	Ala	Thr	Gly	Gly	Leu	Ala	
	210					215					220					
ccg	ctc	att	gcg	aac	gaa	tca	gat	tgt	ata	gac	atc	gtt	gat	cca	ttc	720
Pro	Leu	Ile	Ala	Asn	Glu	Ser	Asp	Cys	Ile	Asp	Ile	Val	Asp	Pro	Phe	
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Leu	Thr	Leu	Lys	Gly	Leu	Glu	Leu	Ile	Tyr	Glu	Arg	Asn	Arg	Val	Gly	
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Ser	Val															

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 <213> Bacillus subtilis

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 20 25 30
 His Lys Thr Glu Asp Glu Phe Gly Met Ile Leu Arg Ser Leu Phe Asp
 35 40 45
 His Ser Gly Leu Met Phe Glu Gln Ile Asp Gly Ile Ile Ile Ser Ser
 50 55 60
 Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr
 65 70 75 80
 Phe His Ile Glu Pro Gln Ile Val Gly Pro Gly Met Lys Thr Gly Leu

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Asn	Ile	Lys	Tyr	Asp	Asn	Pro	Lys	Glu	Val	Gly	Ala	Asp	Arg	Ile	Val		
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Asn	Ala	Val	Ala	Ala	Ile	His	Leu	Tyr	Gly	Asn	Pro	Leu	Ile	Val	Val		
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Asp	Phe	Gly	Thr	Ala	Thr	Thr	Tyr	Cys	Tyr	Ile	Asp	Glu	Asn	Lys	Gln		
	130					135					140						
Tyr	Met	Gly	Gly	Ala	Ile	Ala	Pro	Gly	Ile	Thr	Ile	Ser	Thr	Glu	Ala		
145					150					155					160		
Leu	Tyr	Ser	Arg	Ala	Ala	Lys	Leu	Pro	Arg	Ile	Glu	Ile	Thr	Arg	Pro		
				165					170					175			
Asp	Asn	Ile	Ile	Gly	Lys	Asn	Thr	Val	Ser	Ala	Met	Gln	Ser	Gly	Ile		
			180					185					190				
Leu	Phe	Gly	Tyr	Val	Gly	Gln	Val	Glu	Gly	Ile	Val	Lys	Arg	Met	Lys		
		195					200					205					
Trp	Gln	Ala	Lys	Gln	Asp	Leu	Lys	Val	Ile	Ala	Thr	Gly	Gly	Leu	Ala		
	210					215					220						
Pro	Leu	Ile	Ala	Asn	Glu	Ser	Asp	Cys	Ile	Asp	Ile	Val	Asp	Pro	Phe		
225					230					235					240		
Leu	Thr	Leu	Lys	Gly	Leu	Glu	Leu	Ile	Tyr	Glu	Arg	Asn	Arg	Val	Gly		
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Ser Val

<210> 3

<211> 250

<212> PRT

<213> Clostridium acetobutylicum

<400> 3

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Lys	Val	Ile	Leu	Val	Leu	Asp	Val	Gly	Asn	Thr	Asn	Ile	Val	Leu	Gly
			20					25					30		
Ile	Tyr	Asn	Asp	Thr	Lys	Leu	Thr	Ala	Glu	Trp	Arg	Leu	Ser	Thr	Asp
		35					40					45			
Val	Leu	Arg	Ser	Ala	Asp	Glu	Tyr	Gly	Ile	Gln	Val	Met	Asn	Leu	Phe
	50				55						60				
Gln	Gln	Asp	Lys	Leu	Asp	Pro	Thr	Leu	Val	Glu	Gly	Val	Ile	Ile	Ser
65					70					75					80
Ser	Val	Val	Pro	Asn	Ile	Met	Tyr	Ser	Leu	Glu	His	Met	Ile	Arg	Lys
				85					90					95	
Tyr	Phe	Lys	Ile	Asn	Pro	Leu	Val	Val	Gly	Pro	Gly	Ile	Lys	Thr	Gly

100					105					110					
Ile	Asn	Ile	Lys	Tyr	Asp	Asn	Pro	Lys	Glu	Val	Gly	Ala	Asp	Arg	Ile
	115						120					125			
Val	Asn	Ala	Val	Ala	Ala	His	Glu	Ile	Tyr	Lys	Arg	Ser	Leu	Ile	Ile
	130					135					140				
Ile	Asp	Phe	Gly	Thr	Ala	Thr	Thr	Phe	Cys	Ala	Val	Arg	Glu	Asn	Gly
145					150					155					160
Asp	Tyr	Leu	Gly	Gly	Ala	Ile	Cys	Pro	Gly	Ile	Lys	Val	Ser	Ser	Glu
				165					170					175	
Ala	Leu	Phe	Glu	Lys	Ala	Ala	Lys	Leu	Pro	Arg	Val	Glu	Leu	Ile	Lys
			180					185					190		
Pro	Ala	Tyr	Ala	Ile	Cys	Lys	Asn	Thr	Ile	Ser	Ser	Ile	Gln	Ser	Gly
	195						200					205			
Ile	Val	Tyr	Arg	Tyr	Leu	Arg	Gln	Val	Lys	Tyr	Leu	Phe	Glu	Lys	Leu
	210					215					220				
Lys	Glu	Asn	Leu	Pro	Asp	Gly	Arg	Arg	Thr	Arg	Thr	Ser	Leu	Val	Leu
225					230					235					240
Ala	Thr	Gly	Gly	Leu	Ala	Lys	Leu	Ile	Asn						
				245					250						

<210> 4
 <211> 265
 <212> PRT
 <213> Streptomyces coelicolor

<400> 4
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 20 25 30
 Arg Arg Thr Ala Asp Glu Leu Ala Val Leu Leu Gln Gly Leu Met Gly
 35 40 45
 Met His Pro Leu Leu Gly Asp Glu Leu Gly Asp Gly Ile Asp Gly Ile
 50 55 60
 Ala Ile Cys Ala Thr Val Pro Ser Val Leu His Glu Leu Arg Glu Val
 65 70 75 80
 Thr Arg Arg Tyr Tyr Gly Asp Val Pro Ala Val Leu Val Glu Pro Gly
 85 90 95
 Val Lys Thr Gly Val Pro Ile Leu Thr Asp His Pro Lys Glu Val Gly
 100 105 110
 Ala Asp Arg Ile Ile Asn Ala Val Ala Ala Val Glu Leu Tyr Gly Gly
 115 120 125
 Pro Ala Ile Val Val Asp Phe Gly Thr Ala Thr Thr Phe Asp Ala Val

130 135 140
 Ser Ala Arg Gly Glu Tyr Ile Gly Gly Val Ile Ala Pro Gly Ile Glu
 145 150 155 160
 Ile Ser Val Glu Ala Leu Gly Val Lys Gly Ala Gln Leu Arg Lys Ile
 165 170 175
 Glu Val Ala Arg Pro Arg Ser Val Ile Gly Lys Asn Thr Val Glu Ala
 180 185 190
 Met Gln Ser Gly Ile Val Tyr Gly Phe Ala Gly Gln Val Asp Gly Val
 195 200 205
 Val Asn Arg Met Ala Arg Glu Leu Ala Asp Asp Pro Asp Asp Val Thr
 210 215 220
 Val Ile Ala Thr Gly Gly Leu Ala Pro Met Val Leu Gly Glu Ser Ser
 225 230 235 240
 Val Ile Asp Glu His Glu Pro Trp Leu Thr Leu Met Gly Leu Arg Leu
 245 250 255
 Val Tyr Glu Arg Asn Val Ser Arg Met
 260 265

<210> 5

<211> 272

<212> PRT

<213> Mycobacterium tuberculosis

<400> 5

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 Leu Ser Gly Met Lys Glu His Ala Lys Val Val Gln Gln Trp Arg Ile
 20 25 30
 Arg Thr Glu Ser Glu Val Thr Ala Asp Glu Leu Ala Leu Thr Ile Asp
 35 40 45
 Gly Leu Ile Gly Glu Asp Ser Glu Arg Leu Thr Gly Thr Ala Ala Leu
 50 55 60
 Ser Thr Val Pro Ser Val Leu His Glu Val Arg Ile Met Leu Asp Gln
 65 70 75 80
 Tyr Trp Pro Ser Val Pro His Val Leu Ile Glu Pro Gly Val Arg Thr
 85 90 95
 Gly Ile Pro Leu Leu Val Asp Asn Pro Lys Glu Val Gly Ala Asp Arg
 100 105 110
 Ile Val Asn Cys Leu Ala Ala Tyr Asp Arg Phe Arg Lys Ala Ala Ile
 115 120 125
 Val Val Asp Phe Gly Ser Ser Ile Cys Val Asp Val Val Ser Ala Lys
 130 135 140
 Gly Glu Phe Leu Gly Gly Ala Ile Ala Pro Gly Val Gln Val Ser Ser

145		150		155		160									
Asp	Ala	Ala	Ala	Ala	Arg	Ala	Ala	Leu	Arg	Arg	Val	Glu	Leu	Ala	
			165					170					175		
Arg	Pro	Arg	Ser	Val	Val	Gly	Lys	Asn	Thr	Val	Glu	Cys	Met	Gln	Ala
			180					185					190		
Gly	Ala	Val	Phe	Gly	Phe	Ala	Gly	Leu	Val	Asp	Gly	Leu	Val	Gly	Arg
		195					200					205			
Ile	Arg	Glu	Asp	Val	Ser	Gly	Phe	Ser	Val	Asp	His	Asp	Val	Ala	Ile
	210					215					220				
Val	Ala	Thr	Gly	His	Thr	Ala	Pro	Leu	Leu	Leu	Pro	Glu	Leu	His	Thr
225					230					235					240
Val	Asp	His	Tyr	Asp	Gln	His	Leu	Thr	Leu	Gln	Gly	Leu	Arg	Leu	Val
				245					250					255	
Phe	Glu	Arg	Asn	Leu	Glu	Val	Gln	Arg	Gly	Arg	Leu	Lys	Thr	Ala	Arg
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<210> 6

<211> 258

<212> PRT

<213> Rhodobacter capsulatus

<400> 6

Met	Leu	Leu	Cys	Ile	Asp	Cys	Gly	Asn	Thr	Asn	Thr	Val	Phe	Ser	Val
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Trp	Asp	Gly	Thr	Asp	Phe	Ala	Ala	Thr	Trp	Arg	Ile	Ala	Thr	Asp	His
			20					25					30		
Arg	Arg	Thr	Ala	Asp	Glu	Tyr	Phe	Val	Trp	Leu	Asn	Thr	Leu	Met	Gln
			35				40					45			
Leu	Lys	Gly	Leu	Gln	Gly	Arg	Ile	Ser	Glu	Ala	Ile	Ile	Ser	Ser	Thr
	50					55					60				
Ala	Pro	Arg	Val	Val	Phe	Asn	Leu	Arg	Val	Leu	Cys	Asn	Arg	Tyr	Phe
65					70					75					80
Asp	Cys	Arg	Pro	Tyr	Val	Val	Gly	Lys	Pro	Gly	Cys	Glu	Leu	Pro	Val
				85					90					95	
Ala	Pro	Arg	Val	Asp	Pro	Gly	Thr	Thr	Val	Gly	Pro	Asp	Arg	Leu	Val
			100					105					110		
Asn	Thr	Val	Ala	Gly	Tyr	Asp	Arg	His	Gly	Gly	Asp	Leu	Ile	Val	Val
			115				120					125			
Asp	Phe	Gly	Thr	Ala	Thr	Thr	Phe	Asp	Val	Val	Ala	Pro	Asp	Gly	Ala
	130					135					140				
Tyr	Ile	Gly	Gly	Val	Ile	Ala	Pro	Gly	Val	Asn	Leu	Ser	Leu	Glu	Ala
145					150					155					160
Leu	His	Met	Ala	Ala	Ala	Ala	Leu	Pro	His	Val	Asp	Val	Thr	Lys	Pro

				165					170					175		
Gln	Gly	Val	Ile	Gly	Thr	Asn	Thr	Val	Ala	Cys	Ile	Gln	Ser	Gly	Val	
			180					185					190			
Tyr	Trp	Gly	Tyr	Ile	Gly	Leu	Val	Glu	Gly	Ile	Val	Arg	Gln	Ile	Arg	
		195					200					205				
Met	Glu	Arg	Asp	Arg	Pro	Met	Lys	Val	Ile	Ala	Thr	Gly	Gly	Leu	Ala	
	210					215					220					
Ser	Leu	Phe	Asp	Leu	Gly	Phe	Asp	Leu	Phe	Asp	Lys	Val	Glu	Asp	Asp	
225					230					235					240	
Leu	Thr	Met	His	Gly	Leu	Arg	Leu	Ile	Phe	Asp	Tyr	Asn	Lys	Gly	Leu	
				245					250					255		

Gly Ala

<210> 7
 <211> 255
 <212> PRT
 <213> Geobacter sulfurreducens

<400> 7

Met	Leu	Leu	Val	Ile	Asp	Val	Gly	Asn	Thr	Asn	Ile	Val	Leu	Gly	Ile
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Tyr	Asp	Gly	Glu	Arg	Leu	Val	Arg	Asp	Trp	Arg	Val	Ser	Thr	Asp	Lys
			20					25					30		
Ala	Arg	Thr	Thr	Asp	Glu	Tyr	Gly	Ile	Leu	Ile	Asn	Glu	Leu	Phe	Arg
			35				40					45			
Leu	Ala	Gly	Leu	Gly	Leu	Asp	Gln	Ile	Arg	Ala	Val	Ile	Ile	Ser	Ser
	50					55					60				
Val	Val	Pro	Pro	Leu	Thr	Gly	Val	Leu	Glu	Arg	Leu	Ser	Leu	Gly	Tyr
65					70					75					80
Phe	Gly	Met	Arg	Pro	Leu	Val	Val	Gly	Pro	Gly	Ile	Lys	Thr	Gly	Met
				85					90					95	
Pro	Ile	Gln	Tyr	Asp	Asn	Pro	Arg	Glu	Val	Gly	Ala	Asp	Arg	Ile	Val
			100					105					110		
Asn	Ala	Val	Ala	Gly	Tyr	Glu	Lys	Tyr	Arg	Thr	Ser	Leu	Ile	Ile	Val
		115					120					125			
Asp	Phe	Gly	Thr	Ala	Thr	Thr	Phe	Asp	Tyr	Val	Asn	Arg	Lys	Gly	Glu
	130					135					140				
Tyr	Cys	Gly	Gly	Ala	Ile	Ala	Pro	Gly	Leu	Val	Ile	Ser	Thr	Glu	Ala
145					150					155					160
Leu	Phe	Gln	Arg	Ala	Ser	Lys	Leu	Pro	Arg	Val	Asp	Ile	Ile	Arg	Pro
				165					170					175	
Ser	Ala	Ile	Ile	Ala	Arg	Asn	Thr	Val	Asn	Ser	Met	Gln	Ala	Gly	Ile

			180					185					190				
Tyr	Tyr	Gly	Tyr	Val	Gly	Leu	Val	Asp	Glu	Ile	Val	Thr	Arg	Met	Lys		
		195					200					205					
Ala	Glu	Ser	Lys	Asp	Ala	Pro	Arg	Val	Ile	Ala	Thr	Gly	Gly	Leu	Ala		
	210					215					220						
Ser	Leu	Ile	Ala	Pro	Glu	Ser	Lys	Thr	Ile	Glu	Ala	Val	Glu	Glu	Tyr		
225					230					235					240		
Leu	Thr	Leu	Glu	Gly	Leu	Arg	Ile	Leu	Tyr	Glu	Arg	Asn	Arg	Glu			
			245						250					255			

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 <213> Deinococcus radiopugnans

<400> 8

Met	Pro	Ala	Phe	Pro	Leu	Leu	Ala	Val	Asp	Ile	Gly	Asn	Thr	Thr	Thr		
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Val	Leu	Gly	Leu	Ala	Asp	Ala	Ser	Gly	Ala	Leu	Thr	His	Thr	Trp	Arg		
			20					25					30				
Ile	Arg	Thr	Asn	Arg	Glu	Met	Leu	Pro	Asp	Asp	Leu	Ala	Leu	Gln	Leu		
		35					40					45					
His	Gly	Leu	Phe	Thr	Leu	Ala	Gly	Ala	Pro	Ile	Pro	Arg	Ala	Ala	Val		
	50					55					60						
Leu	Ser	Ser	Val	Ala	Pro	Pro	Val	Gly	Glu	Asn	Tyr	Ala	Leu	Ala	Leu		
65					70					75					80		
Lys	Arg	His	Phe	Met	Ile	Asp	Ala	Phe	Ala	Val	Ser	Ala	Glu	Asn	Leu		
				85					90					95			
Pro	Asp	Val	Thr	Val	Glu	Leu	Asp	Thr	Pro	Gly	Ser	Val	Gly	Ala	Asp		
			100					105					110				
Arg	Leu	Cys	Asn	Leu	Phe	Gly	Ala	Glu	Lys	Tyr	Leu	Gly	Gly	Leu	Asp		
		115					120					125					
Tyr	Ala	Val	Val	Val	Asp	Phe	Gly	Thr	Ser	Thr	Asn	Phe	Asp	Val	Val		
	130					135					140						
Gly	Arg	Gly	Arg	Arg	Phe	Leu	Gly	Gly	Ile	Leu	Ala	Thr	Gly	Ala	Gln		
145					150					155					160		
Val	Ser	Ala	Asp	Ala	Leu	Phe	Ala	Arg	Ala	Ala	Lys	Leu	Pro	Arg	Ile		
				165				170						175			
Thr	Leu	Gln	Ala	Pro	Glu	Thr	Ala	Ile	Gly	Lys	Asn	Thr	Val	His	Ala		
			180					185					190				
Leu	Gln	Ser	Gly	Leu	Val	Phe	Gly	Tyr	Ala	Glu	Met	Val	Asp	Gly	Leu		
		195					200					205					
Leu	Arg	Arg	Ile	Arg	Ala	Glu	Leu	Pro	Gly	Glu	Ala	Val	Ala	Val	Ala		

210		215		220
Thr Gly Gly Phe Ser Arg Thr Val Gln Gly Ile Cys Gln Glu Ile Asp				
225		230		235
				240
Tyr Tyr Asp Glu Thr Leu Thr Leu Arg Gly Leu Val Glu Leu Trp Ala				
	245		250	255
Ser Arg Ser Glu Val Arg				
	260			

<210> 9
 <211> 246
 <212> PRT
 <213> Thermotoga maritima

<400> 9

Met Tyr Leu Leu Val Asp Val Gly Asn Thr His Ser Val Phe Ser Ile				
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				15
Thr Glu Asp Gly Lys Thr Phe Arg Arg Trp Arg Leu Ser Thr Gly Val				
	20		25	30
Phe Gln Thr Glu Asp Glu Leu Phe Ser His Leu His Pro Leu Leu Gly				
	35		40	45
Asp Ala Met Arg Glu Ile Lys Gly Ile Gly Val Ala Ser Val Val Pro				
	50		55	60
Thr Gln Asn Thr Val Ile Glu Arg Phe Ser Gln Lys Tyr Phe His Ile				
	65		70	75
				80
Ser Pro Ile Trp Val Lys Ala Lys Asn Gly Cys Val Lys Trp Asn Val				
		85	90	95
Lys Asn Pro Ser Glu Val Gly Ala Asp Arg Val Ala Asn Val Val Ala				
	100		105	110
Phe Val Lys Glu Tyr Gly Lys Asn Gly Ile Ile Ile Asp Met Gly Thr				
	115		120	125
Ala Thr Thr Val Asp Leu Val Val Asn Gly Ser Tyr Glu Gly Gly Ala				
	130		135	140
Ile Leu Pro Gly Phe Phe Met Met Val His Ser Leu Phe Arg Gly Thr				
	145		150	155
				160
Ala Lys Leu Pro Leu Val Glu Val Lys Pro Ala Asp Phe Val Val Gly				
	165		170	175
Lys Asp Thr Glu Glu Asn Ile Arg Leu Gly Val Val Asn Gly Ser Val				
	180		185	190
Tyr Ala Leu Glu Gly Ile Ile Gly Arg Ile Lys Glu Val Tyr Gly Asp				
	195		200	205
Leu Pro Val Val Leu Thr Gly Gly Gln Ser Lys Ile Val Lys Asp Met				
	210		215	220
Ile Lys His Glu Ile Phe Asp Glu Asp Leu Thr Ile Lys Gly Val Tyr				

225					230					235					240
His	Phe	Cys	Phe	Gly	Asp										
				245											
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<212> PRT															
<213> Treponema pallidum															
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Gly	Glu	Asn	Gly	Gly	Arg	Val	Cys	Val	Arg	Glu	Leu	Phe	Arg	Leu	Ala
			20					25					30		
Pro	Asp	Ala	Arg	Lys	Thr	Gln	Asp	Glu	Tyr	Ser	Leu	Leu	Ile	His	Ala
		35					40					45			
Leu	Cys	Glu	Arg	Ala	Gly	Val	Gly	Arg	Ala	Ser	Leu	Arg	Asp	Ala	Phe
	50					55					60				
Ile	Ser	Ser	Val	Val	Pro	Val	Leu	Thr	Lys	Thr	Ile	Ala	Asp	Ala	Val
65					70					75					80
Ala	Gln	Ile	Ser	Gly	Val	Gln	Pro	Val	Val	Phe	Gly	Pro	Trp	Ala	Tyr
				85					90					95	
Glu	His	Leu	Pro	Val	Arg	Ile	Pro	Glu	Pro	Val	Arg	Ala	Glu	Ile	Gly
			100					105					110		
Thr	Asp	Leu	Val	Ala	Asn	Ala	Val	Ala	Ala	Tyr	Val	His	Phe	Arg	Ser
		115					120					125			
Ala	Cys	Val	Val	Val	Asp	Cys	Gly	Thr	Ala	Leu	Thr	Phe	Thr	Ala	Val
	130					135					140				
Asp	Gly	Thr	Gly	Leu	Ile	Gln	Gly	Val	Ala	Ile	Ala	Pro	Gly	Leu	Arg
145					150					155					160
Thr	Ala	Val	Gln	Ser	Leu	His	Thr	Gly	Thr	Ala	Gln	Leu	Pro	Leu	Val
				165					170					175	
Pro	Leu	Ala	Leu	Pro	Asp	Ser	Val	Leu	Gly	Lys	Asp	Thr	Thr	His	Ala
			180					185					190		
Val	Gln	Ala	Gly	Val	Val	Arg	Gly	Thr	Leu	Phe	Val	Ile	Arg	Ala	Met
		195					200					205			
Ile	Ala	Gln	Cys	Gln	Lys	Glu	Leu	Gly	Cys	Arg	Cys	Ala	Ala	Val	Ile
	210					215					220				
Thr	Gly	Gly	Leu	Ser	Arg	Leu	Phe	Ser	Ser	Glu	Val	Asp	Phe	Pro	Pro
225					230					235					240
Ile	Asp	Ala	Gln	Leu	Thr	Leu	Ser	Gly	Leu	Ala	His	Ile	Ala	Arg	Leu
				245					250					255	
Val	Pro	Thr	Ser	Leu	Leu	Pro	Pro	Ala	Thr	Val	Ser	Gly	Ser	Ser	Gly

260

265

270

Asn

<210> 11

<211> 262

<212> PRT

<213> *Borrelia burgdorferi*

<400> 11

Met Asn Lys Pro Leu Leu Ser Glu Leu Ile Ile Asp Ile Gly Asn Thr
 1 5 10 15

Ser Ile Ala Phe Ala Leu Phe Lys Asp Asn Gln Val Asn Leu Phe Ile
 20 25 30

Lys Met Lys Thr Asn Leu Met Leu Arg Tyr Asp Glu Val Tyr Ser Phe
 35 40 45

Phe Glu Glu Asn Phe Asp Phe Asn Val Asn Lys Val Phe Ile Ser Ser
 50 55 60

Val Val Pro Ile Leu Asn Glu Thr Phe Lys Asn Val Ile Phe Ser Phe
 65 70 75 80

Phe Lys Ile Lys Pro Leu Phe Ile Gly Phe Asp Leu Asn Tyr Asp Leu
 85 90 95

Thr Phe Asn Pro Tyr Lys Ser Asp Lys Phe Leu Leu Gly Ser Asp Val
 100 105 110

Phe Ala Asn Leu Val Ala Ala Ile Glu Asn Tyr Ser Phe Glu Asn Val
 115 120 125

Leu Val Val Asp Leu Gly Thr Ala Cys Thr Ile Phe Ala Val Ser Arg
 130 135 140

Gln Asp Gly Ile Leu Gly Gly Ile Ile Asn Ser Gly Pro Leu Ile Asn
 145 150 155 160

Phe Asn Ser Leu Leu Asp Asn Ala Tyr Leu Ile Lys Lys Phe Pro Ile
 165 170 175

Ser Thr Pro Asn Asn Leu Leu Glu Arg Thr Thr Ser Gly Ser Val Asn
 180 185 190

Ser Gly Leu Phe Tyr Gln Tyr Lys Tyr Leu Ile Glu Gly Val Tyr Arg
 195 200 205

Asp Ile Lys Gln Met Tyr Lys Lys Lys Phe Asn Leu Ile Ile Thr Gly
 210 215 220

Gly Asn Ala Asp Leu Ile Leu Ser Leu Ile Glu Ile Glu Phe Ile Phe
 225 230 235 240

Asn Ile His Leu Thr Val Glu Gly Val Arg Ile Leu Gly Asn Ser Ile
 245 250 255

Asp Phe Lys Phe Val Asn

260

<210> 12
 <211> 229
 <212> PRT
 <213> Aquifex aeolicus

<400> 12
 Met Arg Phe Leu Thr Val Asp Val Gly Asn Ser Ser Val Asp Ile Ala
 1 5 10 15
 Leu Trp Glu Gly Lys Lys Val Lys Asp Phe Leu Lys Leu Ser His Glu
 20 25 30
 Glu Phe Leu Lys Glu Glu Phe Pro Lys Leu Lys Ala Leu Gly Ile Ser
 35 40 45
 Val Lys Gln Ser Phe Ser Glu Lys Val Arg Gly Lys Ile Pro Lys Ile
 50 55 60
 Lys Phe Leu Lys Lys Glu Asn Phe Pro Ile Gln Val Asp Tyr Lys Thr
 65 70 75 80
 Pro Glu Thr Leu Gly Thr Asp Arg Val Ala Leu Ala Tyr Ser Ala Lys
 85 90 95
 Lys Phe Tyr Gly Lys Asn Val Val Val Ile Ser Ala Gly Thr Ala Leu
 100 105 110
 Val Ile Asp Leu Val Leu Glu Gly Lys Phe Lys Gly Gly Phe Ile Thr
 115 120 125
 Leu Gly Leu Gly Lys Lys Leu Lys Ile Leu Ser Asp Leu Ala Glu Gly
 130 135 140
 Ile Pro Glu Phe Phe Pro Glu Glu Val Glu Ile Phe Leu Gly Arg Ser
 145 150 155 160
 Thr Arg Glu Cys Val Leu Gly Gly Ala Tyr Arg Glu Ser Thr Glu Phe
 165 170 175
 Ile Lys Ser Thr Leu Lys Leu Trp Arg Lys Val Phe Lys Arg Lys Phe
 180 185 190
 Lys Val Val Ile Thr Gly Gly Glu Gly Lys Tyr Phe Ser Lys Phe Gly
 195 200 205
 Ile Tyr Asp Pro Leu Leu Val His Arg Gly Met Arg Asn Leu Leu Tyr
 210 215 220
 Leu Tyr His Arg Ile
 225

<210> 13
 <211> 257
 <212> PRT
 <213> Synechocystis sp.

<400> 13

Met	Glu	Thr	Ser	Lys	Pro	Gly	Cys	Gly	Leu	Ala	Leu	Asp	Asn	Asp	Lys	1	5	10	15
Gln	Lys	Pro	Trp	Leu	Gly	Leu	Met	Ile	Gly	Asn	Ser	Arg	Leu	His	Trp	20	25	30	
Ala	Tyr	Cys	Ser	Gly	Asn	Ala	Pro	Leu	Gln	Thr	Trp	Val	Thr	Asp	Tyr	35	40	45	
Asn	Pro	Lys	Ser	Ala	Gln	Leu	Pro	Val	Leu	Leu	Gly	Lys	Val	Pro	Leu	50	55	60	
Met	Leu	Ala	Ser	Val	Val	Pro	Glu	Gln	Thr	Glu	Val	Trp	Arg	Val	Tyr	65	70	75	80
Gln	Pro	Lys	Ile	Leu	Thr	Leu	Lys	Asn	Leu	Pro	Leu	Val	Asn	Leu	Tyr	85	90	95	
Pro	Ser	Phe	Gly	Ile	Asp	Arg	Ala	Leu	Ala	Gly	Leu	Gly	Thr	Gly	Leu	100	105	110	
Thr	Tyr	Gly	Phe	Pro	Cys	Leu	Val	Val	Asp	Gly	Gly	Thr	Ala	Leu	Thr	115	120	125	
Ile	Thr	Gly	Phe	Asp	Gln	Asp	Lys	Lys	Leu	Val	Gly	Gly	Ala	Ile	Leu	130	135	140	
Pro	Gly	Leu	Gly	Leu	Gln	Leu	Ala	Thr	Leu	Gly	Asp	Arg	Leu	Ala	Ala	145	150	155	160
Leu	Pro	Lys	Leu	Glu	Met	Asp	Gln	Leu	Thr	Glu	Leu	Pro	Asp	Arg	Trp	165	170	175	
Ala	Leu	Asp	Thr	Pro	Ser	Ala	Ile	Phe	Ser	Gly	Val	Val	Tyr	Gly	Val	180	185	190	
Leu	Gly	Ala	Leu	Gln	Ser	Tyr	Leu	Gln	Asp	Trp	Gln	Lys	Leu	Phe	Pro	195	200	205	
Gly	Ala	Ala	Met	Val	Ile	Thr	Gly	Gly	Asp	Gly	Lys	Ile	Leu	His	Gly	210	215	220	
Phe	Leu	Lys	Glu	His	Ser	Pro	Asn	Leu	Ser	Val	Ala	Trp	Asp	Asp	Asn	225	230	235	240
Leu	Ile	Phe	Leu	Gly	Met	Ala	Ala	Ile	His	His	Gly	Asp	Arg	Pro	Ile	245	250	255	

Cys

<210> 14

<211> 223

<212> PRT

<213> Helicobacter pylori

<400> 14

Met	Pro	Ala	Arg	Gln	Ser	Phe	Thr	Asp	Leu	Lys	Asn	Leu	Val	Leu	Cys	1	5	10	15
-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	-----	---	---	----	----

Asp Ile Gly Asn Thr Arg Ile His Phe Ala Gln Asn Tyr Gln Leu Phe
 20 25 30
 Ser Ser Ala Lys Glu Asp Leu Lys Arg Leu Gly Ile Gln Lys Glu Ile
 35 40 45
 Phe Tyr Ile Ser Val Asn Glu Glu Asn Glu Lys Ala Leu Leu Asn Cys
 50 55 60
 Tyr Pro Asn Ala Lys Asn Ile Ala Gly Phe Phe His Leu Glu Thr Asp
 65 70 75 80
 Tyr Val Gly Leu Gly Ile Asp Arg Gln Met Ala Cys Leu Ala Val Asn
 85 90 95
 Asn Gly Val Val Val Asp Ala Gly Ser Ala Ile Thr Ile Asp Leu Ile
 100 105 110
 Lys Glu Gly Lys His Leu Gly Gly Cys Ile Leu Pro Gly Leu Ala Gln
 115 120 125
 Tyr Ile His Ala Tyr Lys Lys Ser Ala Lys Ile Leu Glu Gln Pro Phe
 130 135 140
 Lys Ala Leu Asp Ser Leu Glu Val Leu Pro Lys Ser Thr Arg Asp Ala
 145 150 155 160
 Val Asn Tyr Gly Met Val Leu Ser Val Ile Ala Cys Ile Gln His Leu
 165 170 175
 Ala Lys Asn Gln Lys Ile Tyr Leu Cys Gly Gly Asp Ala Lys Tyr Leu
 180 185 190
 Ser Ala Phe Leu Pro His Ser Val Cys Lys Glu Arg Leu Val Phe Asp
 195 200 205
 Gly Met Glu Ile Ala Leu Lys Lys Ala Gly Ile Leu Glu Cys Lys
 210 215 220

<210> 15
 <211> 267
 <212> PRT
 <213> Bordetella pertussis

<400> 15
 Met Ile Ile Leu Ile Asp Ser Gly Asn Ser Arg Leu Lys Val Gly Trp
 1 5 10 15
 Phe Asp Pro Asp Ala Pro Gln Ala Ala Arg Glu Pro Ala Pro Val Ala
 20 25 30
 Phe Asp Asn Leu Asp Leu Asp Ala Leu Gly Arg Trp Leu Ala Thr Leu
 35 40 45
 Pro Arg Arg Pro Gln Arg Ala Leu Gly Val Asn Val Ala Gly Leu Ala
 50 55 60
 Arg Gly Glu Ala Ile Ala Ala Thr Leu Arg Ala Gly Gly Cys Asp Ile
 65 70 75 80

<400> 16																
ttg	tta	ctg	gtt	atc	gat	gtg	ggg	aac	acc	aat	act	gta	ctt	ggt	gta	48
Met	Leu	Leu	Val	Ile	Asp	Val	Gly	Asn	Thr	Asn	Thr	Val	Leu	Gly	Val	
1				5					10					15		
tat	cat	gat	gga	aaa	tta	gaa	tat	cac	tgg	cgt	ata	gaa	aca	agc	agg	96
Tyr	His	Asp	Gly	Lys	Leu	Glu	Tyr	His	Trp	Arg	Ile	Glu	Thr	Ser	Arg	
			20					25					30			
cat	aaa	aca	gaa	gat	gag	ttt	ggg	atg	att	ttg	cgc	tcc	tta	ttt	gat	144
His	Lys	Thr	Glu	Asp	Glu	Phe	Gly	Met	Ile	Leu	Arg	Ser	Leu	Phe	Asp	
		35					40					45				
cac	tcc	ggg	ctt	atg	ttt	gaa	cag	ata	gat	ggc	att	att	att	tcg	tca	192
His	Ser	Gly	Leu	Met	Phe	Glu	Gln	Ile	Asp	Gly	Ile	Ile	Ile	Ser	Ser	

50	55	60	
gta gtg ccg cca atc atg ttt gcg tta gaa aga atg tgc aca aaa tac			240
Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr			
65	70	75	80
ttt cat atc gag cct caa att gtt ggt cca ggt atg aaa acc ggt tta			288
Phe His Ile Glu Pro Gln Ile Val Gly Pro Gly Met Lys Thr Gly Leu			
	85	90	95
aat ata aaa tat gac aat ccg aaa gaa gta ggg gca gac aga atc gta			336
Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val			
	100	105	110
aat gct gtc gct gcg ata cac ttg tac ggc aat cca tta att gtt gtc			384
Asn Ala Val Ala Ala Ile His Leu Tyr Gly Asn Pro Leu Ile Val Val			
	115	120	125
gat ttc gga acc gcc aca acg tac tgc tat att gat gaa aac aaa caa			432
Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asp Glu Asn Lys Gln			
	130	135	140
tac atg ggc ggg gcg att gcc cct ggg att aca att tcg aca gag gcg			480
Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Thr Ile Ser Thr Glu Ala			
	145	150	155
ctt tac tcg cgt gca gca aag ctt cct cgt atc gaa atc acc cgg ccc			528
Leu Tyr Ser Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Thr Arg Pro			
	165	170	175
gac aat att atc gga aaa aac act gtt agc gcg atg caa tct gga att			576
Asp Asn Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ser Gly Ile			
	180	185	190
tta ttt ggc tat gtc ggc caa gtg gaa gga atc gtt aag cga atg aaa			624
Leu Phe Gly Tyr Val Gly Gln Val Glu Gly Ile Val Lys Arg Met Lys			
	195	200	205
tgg cag gca aaa cag gac cca agg tca ttg cga cag gag gcc tgg cgc			672
Trp Gln Ala Lys Gln Asp Pro Arg Ser Leu Arg Gln Glu Ala Trp Arg			
	210	215	220
cgc tca ttg cga acg aat cag att gta tag			702
Arg Ser Leu Arg Thr Asn Gln Ile Val			
	225	230	

<210> 17

<211> 233

<212> PRT

<213> Bacillus subtilis

<400> 17

Met	Leu	Leu	Val	Ile	Asp	Val	Gly	Asn	Thr	Asn	Thr	Val	Leu	Gly	Val
1				5				10					15		

Tyr	His	Asp	Gly	Lys	Leu	Glu	Tyr	His	Trp	Arg	Ile	Glu	Thr	Ser	Arg
			20					25					30		

His	Lys	Thr	Glu	Asp	Glu	Phe	Gly	Met	Ile	Leu	Arg	Ser	Leu	Phe	Asp
			35				40					45			

His Ser Gly Leu Met Phe Glu Gln Ile Asp Gly Ile Ile Ile Ser Ser
 50 55 60
 Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Thr Lys Tyr
 65 70 75 80
 Phe His Ile Glu Pro Gln Ile Val Gly Pro Gly Met Lys Thr Gly Leu
 85 90 95
 Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val
 100 105 110
 Asn Ala Val Ala Ala Ile His Leu Tyr Gly Asn Pro Leu Ile Val Val
 115 120 125
 Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asp Glu Asn Lys Gln
 130 135 140
 Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Thr Ile Ser Thr Glu Ala
 145 150 155 160
 Leu Tyr Ser Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Thr Arg Pro
 165 170 175
 Asp Asn Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ser Gly Ile
 180 185 190
 Leu Phe Gly Tyr Val Gly Gln Val Glu Gly Ile Val Lys Arg Met Lys
 195 200 205
 Trp Gln Ala Lys Gln Asp Pro Arg Ser Leu Arg Gln Glu Ala Trp Arg
 210 215 220
 Arg Ser Leu Arg Thr Asn Gln Ile Val
 225 230

<210> 18
 <211> 163
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:promoter
 sequence

<220>
 <221> -35_signal
 <222> (113)..(118)

<220>
 <221> -10_signal
 <222> (136)..(141)

<400> 18
 gcctacctag cttccaagaa agatattccta acagcacaag agcggaaaga tgttttgttc 60
 tacatccaga acaacctctg ctaaaattcc tgaaaaattt tgcaaaaagt tgttgacttt 120
 atctacaagg tgtggtataa taatcttaac aacagcagga cgc 163

<210> 19
 <211> 194
 <212> DNA
 <213> Artificial Sequence

<220>
 <223> Description of Artificial Sequence:promoter
 sequence

<220>
 <221> -35_signal
 <222> (136)..(141)

<220>
 <221> -10_signal
 <222> (159)..(164)

<400> 19
 gctattgacg acagctatgg ttcactgtcc accaaccaaa actgtgctca gtaccgccaa 60
 tattttctccc ttgaggggta caaagagggtg tccctagaag agatccacgc tgtgtaaaaa 120
 ttttacaaaa aggtattgac tttccctaca ggggtgtgtaa taatttaatt acaggcgggg 180
 gcaaccccg c t g t 194

<210> 20
 <211> 248
 <212> PRT
 <213> Pseudomonas aeruginosa

<400> 20
 Met Ile Leu Glu Leu Asp Cys Gly Asn Ser Leu Ile Lys Trp Arg Val
 1 5 10 15
 Ile Glu Gly Ala Ala Arg Ser Val Ala Gly Gly Leu Ala Glu Ser Asp
 20 25 30
 Asp Ala Leu Val Glu Gln Leu Thr Ser Gln Gln Ala Leu Pro Val Arg
 35 40 45
 Ala Cys Arg Leu Val Ser Val Arg Ser Glu Gln Glu Thr Ser Gln Leu
 50 55 60
 Val Ala Arg Leu Glu Gln Leu Phe Pro Val Ser Ala Leu Val Ala Ser
 65 70 75 80
 Ser Gly Lys Gln Leu Ala Gly Val Arg Asn Gly Tyr Leu Asp Tyr Gln
 85 90 95
 Arg Leu Gly Leu Asp Arg Trp Leu Ala Leu Val Ala Ala His His Leu
 100 105 110
 Ala Lys Lys Ala Cys Leu Val Ile Asp Leu Gly Thr Ala Val Thr Ser
 115 120 125
 Asp Leu Val Ala Ala Asp Gly Val His Leu Gly Gly Tyr Ile Cys Pro
 130 135 140

Gly Met Thr Leu Met Arg Ser Gln Leu Arg Thr His Thr Arg Arg Ile
 145 150 155 160
 Arg Tyr Asp Asp Ala Glu Ala Arg Arg Ala Leu Ala Ser Leu Gln Pro
 165 170 175
 Gly Gln Ala Thr Ala Glu Ala Val Glu Arg Gly Cys Leu Leu Met Leu
 180 185 190
 Arg Gly Phe Val Arg Glu Gln Tyr Ala Met Ala Cys Glu Leu Leu Gly
 195 200 205
 Pro Asp Cys Glu Ile Phe Leu Thr Gly Gly Asp Ala Glu Leu Val Arg
 210 215 220
 Asp Glu Leu Ala Gly Ala Arg Ile Met Pro Asp Leu Val Phe Val Gly
 225 230 235 240
 Leu Ala Leu Ala Cys Pro Ile Glu
 245

<210> 21
 <211> 209
 <212> PRT
 <213> Campylobacter jejuni

<400> 21
 Met Leu Leu Cys Asp Ile Gly Asn Ser Asn Ala Asn Phe Leu Asp Asp
 1 5 10 15
 Asn Lys Tyr Phe Thr Leu Asn Ile Asp Gln Phe Leu Glu Phe Lys Asn
 20 25 30
 Glu Gln Lys Ile Phe Tyr Ile Asn Val Asn Glu His Leu Lys Glu His
 35 40 45
 Leu Lys Asn Gln Lys Asn Phe Ile Asn Leu Glu Pro Tyr Phe Leu Phe
 50 55 60
 Asp Thr Ile Tyr Gln Gly Leu Gly Ile Asp Arg Ile Ala Ala Cys Tyr
 65 70 75 80
 Thr Ile Glu Asp Gly Val Val Val Asp Ala Gly Ser Ala Ile Thr Ile
 85 90 95
 Asp Ile Ile Ser Asn Ser Ile His Leu Gly Gly Phe Ile Leu Pro Gly
 100 105 110
 Ile Ala Asn Tyr Lys Lys Ile Tyr Ser His Ile Ser Pro Arg Leu Lys
 115 120 125
 Ser Glu Phe Asn Thr Gln Val Ser Leu Asp Ala Phe Pro Gln Lys Thr
 130 135 140
 Met Asp Ala Leu Ser Tyr Gly Val Phe Lys Gly Ile Tyr Leu Leu Ile
 145 150 155 160
 Lys Asp Ala Ala Gln Asn Lys Lys Leu Tyr Phe Thr Gly Gly Asp Gly
 165 170 175

Gln Phe Leu Ala Asn Tyr Phe Asp His Ala Ile Tyr Asp Lys Leu Leu
 180 185 190

Ile Phe Arg Gly Met Lys Lys Ile Ile Lys Glu Asn Pro Asn Leu Leu
 195 200 205

Tyr

<210> 22

<211> 592

<212> PRT

<213> Neisseria meningitidis

<400> 22

Met Thr Val Leu Lys Pro Ser His Trp Arg Val Leu Ala Glu Leu Ala
 1 5 10 15

Asp Gly Leu Pro Gln His Val Ser Gln Leu Ala Arg Met Ala Asp Met
 20 25 30

Lys Pro Gln Gln Leu Asn Gly Phe Trp Gln Gln Met Pro Ala His Ile
 35 40 45

Arg Gly Leu Leu Arg Gln His Asp Gly Tyr Trp Arg Leu Val Arg Pro
 50 55 60

Leu Ala Val Phe Asp Ala Glu Gly Leu Arg Glu Leu Gly Glu Arg Ser
 65 70 75 80

Gly Phe Gln Thr Ala Leu Lys His Glu Cys Ala Ser Ser Asn Asp Glu
 85 90 95

Ile Leu Glu Leu Ala Arg Ile Ala Pro Asp Lys Ala His Lys Thr Ile
 100 105 110

Cys Val Thr His Leu Gln Ser Lys Gly Arg Gly Arg Gln Gly Arg Lys
 115 120 125

Trp Ser His Arg Leu Gly Glu Cys Leu Met Phe Ser Phe Gly Trp Val
 130 135 140

Phe Asp Arg Pro Gln Tyr Glu Leu Gly Ser Leu Ser Pro Val Ala Ala
 145 150 155 160

Val Ala Cys Arg Arg Ala Leu Ser Arg Leu Gly Leu Lys Thr Gln Ile
 165 170 175

Lys Trp Pro Asn Asp Leu Val Val Gly Arg Asp Lys Leu Gly Gly Ile
 180 185 190

Leu Ile Glu Thr Val Arg Thr Gly Gly Lys Thr Val Ala Val Val Gly
 195 200 205

Ile Gly Ile Asn Phe Val Leu Pro Lys Glu Val Glu Asn Ala Ala Ser
 210 215 220

Val Gln Ser Leu Phe Gln Thr Ala Ser Arg Arg Gly Asn Ala Asp Ala
 225 230 235 240

Ala Val Leu Leu Glu Thr Leu Leu Ala Glu Leu Asp Ala Val Leu Leu
 245 250 255
 Gln Tyr Ala Arg Asp Gly Phe Ala Pro Phe Val Ala Glu Tyr Gln Ala
 260 265 270
 Ala Asn Arg Asp His Gly Lys Ala Val Leu Leu Leu Arg Asp Gly Glu
 275 280 285
 Thr Val Phe Glu Gly Thr Val Lys Gly Val Asp Gly Gln Gly Val Leu
 290 295 300
 His Leu Glu Thr Ala Glu Gly Lys Gln Thr Val Val Ser Gly Glu Ile
 305 310 315 320
 Ser Leu Arg Ser Asp Asp Arg Pro Val Ser Val Pro Lys Arg Arg Asp
 325 330 335
 Ser Glu Arg Phe Leu Leu Leu Asp Gly Gly Asn Ser Arg Leu Lys Trp
 340 345 350
 Ala Trp Val Glu Asn Gly Thr Phe Ala Thr Val Gly Ser Ala Pro Tyr
 355 360 365
 Arg Asp Leu Ser Pro Leu Gly Ala Glu Trp Ala Glu Lys Val Asp Gly
 370 375 380
 Asn Val Arg Ile Val Gly Cys Ala Val Cys Gly Glu Phe Lys Lys Ala
 385 390 395 400
 Gln Val Gln Glu Gln Leu Ala Arg Lys Ile Glu Trp Leu Pro Ser Ser
 405 410 415
 Ala Gln Ala Leu Gly Ile Arg Asn His Tyr Arg His Pro Glu Glu His
 420 425 430
 Gly Ser Asp Arg Trp Phe Asn Ala Leu Gly Ser Arg Arg Phe Ser Arg
 435 440 445
 Asn Ala Cys Val Val Val Ser Cys Gly Thr Ala Val Thr Val Asp Ala
 450 455 460
 Leu Thr Asp Asp Gly His Tyr Leu Gly Gly Thr Ile Met Pro Gly Phe
 465 470 475 480
 His Leu Met Lys Glu Ser Leu Ala Val Arg Thr Ala Asn Leu Asn Arg
 485 490 495
 His Ala Gly Lys Arg Tyr Pro Phe Pro Thr Thr Thr Gly Asn Ala Val
 500 505 510
 Ala Ser Gly Met Met Asp Ala Val Cys Gly Ser Val Met Met Met His
 515 520 525
 Gly Arg Leu Lys Glu Lys Thr Gly Ala Gly Lys Pro Val Asp Val Ile
 530 535 540
 Ile Thr Gly Gly Gly Ala Ala Lys Val Ala Glu Ala Leu Pro Pro Ala
 545 550 555 560

Phe Leu Ala Glu Asn Thr Val Arg Val Ala Asp Asn Leu Val Ile His
565 570 575

Gly Leu Leu Asn Leu Ile Ala Ala Glu Gly Gly Glu Ser Glu His Thr
580 585 590

<210> 23
<211> 753
<212> DNA
<213> Clostridium acetobutylicum

<400> 23
aataagagag cagcttttat gctgctctta tttttaagga gtgtattaaa agtgatttta 60
gttttagatg ttggcaatac taatatagtg ttaggaatat acaatgatac gaaacttaca 120
gctgaatgga gactatcaac agatgtatta agatctgctg acgaatatgg aattcaagta 180
atgaacttat ttcaacaaga taagctcgat ccaacattag ttgaggaggt aataatatcc 240
tctgttgtag ctaatatcat gtattcttta gaacatatga taagaaagta ctttaagata 300
aatccattag ttgttggaacc tggaataaaa acaggaatta atattaaata cgataatcct 360
aaagaagttg gagccgacag aattgtaaata gctgtagcag cacatgaaat ttataaaaaga 420
tctcttataa taatagattt tggaacagca actacatttt gtgcagtaag agaaaatgga 480
gattatcttg gtggagcaat atgccctgga attaaagttt catcagaggc tctttttgaa 540
aaggcagcta agcttccaag agtagagctc ataaaaccag cgtatgctat ttgtaaaaat 600
actatttcaa gtatacaatc tggaattggt tatcgatacc tacgtcaggt aaaataactta 660
tttgaaaaat tgaaagaaaa cctgccggac ggaaggagaa caaggacctc cttggtattg 720
gccacaggtg gtcttgccaa acttattaat tga 753

<210> 24
<211> 798
<212> DNA
<213> Streptomyces coelicolor

<400> 24
atgctgctga cgatcgacgt agggaaacacg cacaccgtcc tcggcctctt cgacggcgag 60
gacatcgctg agcactggcg catctccacg gactcgcgcc gcacggccga cgaactggcg 120
gtgctcctcc agggcctcat gggcatgcat cccctcctcg gcgacgaact gggcgacggc 180
atcgacggca tcgccatctg cgcgacggtc cctcctcgcc tccacgaact gcgagaggtc 240
accgcccgt actacggcga cgtccccgcg gtcctcgctg aaccgggct caagaccggc 300
gtcccgatec tcaccgacca cccaaggag gtcggcgccg accgcatcat caacgcggta 360
gcggccgtgg agctctacgg cggcccggcg atcgctcggt acttcggcac ggcgacgacg 420
ttcgacgcgg tcagcgcgcg cggggagtag atcgggcgcg tcatcgcccc cggcatcgag 480
atctcggtcg aggcgctggg cgtcaagggc gccagctcc gcaagatcga ggtggcgcg 540
ccccgcagcg tgatcggcaa gaacacggtc gaggcgatgc agtccggcat cgtgtacggc 600
ttcgccggcc aggtcgacgg cgtcgtcaac cgcattggcg gggagctggc cgacgaccgc 660
gacgacgtga cggatcatcg gacggggcgg ctggcgccga tggctcctgg cgagtcctcg 720
gtcatcgacg agcacgagcc gtggctgacg ctgatgggtc tgcgcctggt gtacgagcgc 780
aacgtgtcgc gcatgtag 798

<210> 25
<211> 819
<212> DNA
<213> Mycobacterium tuberculosis

<400> 25
gtgctgctgg cgattgacgt ccgcaacacc cacaccgttg tgggcctgct gtccggaatg 60
aaagagcacg caaaggctgt gcagcagtg cggatacgca ccgaatccga agtcaccgcc 120
gacgaactgg cactgacgat cgacgggctg atcgggcagg attccgagcg gctcaccgg 180
accgcccgt tgtccacggc cccgtccgtg ctgcacgagg tgcggataat gctcgaccag 240
tactggccgt cgggtgccga cgtgctgatc gagcccggag tacgcaccgg gatccctttg 300
ctcgctgaca acccgaagga agtgggcgca gaccgcatcg tgaactgttt ggccgcctat 360
gaccggttcc ggaaggccgc catcgtcgtt gactttggat cctcgatctg tgttgatggt 420

```

gtatcggcca aggggtgaatt tcttggcggc gccatcgcg ccgggggtgca ggtgtcttcc 480
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gtggttgcca agaaccaccgt cgaatgcatg caagccggtg cgggtgttcgg cttcgccggg 600
ctggtagacg ggttggttagg ccgcacccgc gaggacgtgt ccggtttctc cgtcgaccac 660
gatgtcgcca tcgtggctac cgggcatacc gcgcccctgc tgctgccgga attgcacacc 720
gtcgaccatt acgaccagca cctgaccttg cagggtctgc ggctggtgtt cgagcgtaac 780
ctcgaagtcc agcgcgggccg gctcaagacg gcgcgctga 819

```

<210> 26

<211> 777

<212> DNA

<213> *Rhodobacter capsulatus*

<400> 26

```

atgcttttgt gcatcgactg cggcaacacc aacaccgtgt tttcggtctg ggacgggacg 60
gatttcgccg ccacctggcg catcgccacc gatcatcgcc gcaccgccga cgaatatttc 120
gtctggctga acacgctgat gcaactgaag ggccctgcagg gccggtatctc cgaggcgatc 180
atctcctcga ccgcgcccg cgtggtgttc aacctgcgcg ttctgtgcaa ccgctatttc 240
gactgccgcc cctatgtcgt cggcaaaccg ggctgcgagc tgccgggtggc gccgcgcgtc 300
gatccgggca ccacggtcgg gccggaccgg ctggtcaata cggtgggcggg ctatgaccgt 360
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cccgatggcg cctatatcgg cgggggtgat gcgcccgggg tgaacctgag ccttgaggcg 480
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ggcacgaata cggtggcctg catccaatcc ggggtgtatt ggggctatat cggccttgct 600
gaaggcatcg tgcggcagat ccggatggaa cgtgaccgtc cgatgaagggt gattgccacc 660
gggggtcttg cctcgtctct cgatctgggt ttcgatctgt tcgacaagggt cgaggatgac 720
ctgaccatgc atggtctgcg tctgatcttc gattacaaca agggacttgg ggcgtga 777

```

<210> 27

<211> 768

<212> DNA

<213> *Geobacter sulfurreducens*

<400> 27

```

gtgcttcttg ttatagacgt gggtaatacc aatatcgtgc tcgggattta cgatggcgag 60
cgccctggtga gggattggcg ggtctccacg gacaaggccc gtactaccga cgagtacggg 120
attctcataa atgagttgtt ccgcttgggc ggcccttggg tcgatcagat ccgcgcgggt 180
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gacaaccccc gggagggtggg ggccgaccgg atcgtgaacg cggtgggcggg gtacgagaag 360
taccgcacct ctctcattat cgtcgatttc ggcaccgcta ccacgttcga ctacgtgaac 420
cgcaaggagg agtactgcgg aggggccatc gcgcccggac tcgtcatttc caccgaggcc 480
ctgttccagc gggccagcaa gctgcccagg gttgatatac tacgtccgtc cgcgatcatt 540
gccaggaaca cggatcaatt gatgcaggcg ggaatttact atggttacgt ggggctcgta 600
gacgagatcg taccgccgat gaaggccgag agcaaggatg cgccccgggt tatcgctacc 660
ggagggttgg cgtccctcat agcgccggag tccaagacca tcgaagccgt cgaggaatat 720
ctgacactgg agggattgcg catactgtac gaacgaaaca gggagtga 768

```

<210> 28

<211> 789

<212> DNA

<213> *Deinococcus radiodurans*

<400> 28

```

gtgcccgcct ttcccctgct cgccgtggac atcggcaaca ccaccaccgt cctgggtctg 60
gccgacgcct cgggcgcctt gacccacacc tggcggattc ggaccaaccg cgagatgctg 120
cccgacgacc tcgcgctgca actgcacggg ctctttacc tcgccggggc gccgattccc 180
cgcgccgcgg tgctgagcag cgtggcgccc ccggtggggc aaaactacgc gctcgcgctc 240
aagcggcact tcatgatcga cgcttttgcc gtgagtgcgg agaacctgcc cgacgtgacg 300
gtggaactcg acacgccggg ctcggtgggt gcggaccgcc tgtgcaacct cttcggcgcc 360
gaaaagtacc tgggggggct ggactacgcg gtggtagtgg atttcgggac ctccaccaac 420

```



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tttgacgtgg tggggcgggg gggggtttt ctcggcgggc tcctcgccac cggagcgcag 480
gtcagcgccg acgccctgtt cgcccgcgcc gccaaactgc cgcgcatcac cctgcaagcg 540
cccgagacgg ccacgggcaa aaacaccgtc cacgcgctgc aatcgggcct ggtcttcggc 600
tacgcccaga tgggtggacgg cctgctgcgc cgcattccgc ccgagttgcc gggcgaagcg 660
gtcgccgtcg ccactggcgg cttctcgcgc accgtgcagg ggatttgcca ggaaatcgac 720
tactacgacg aaacgctgac gttgcgcggg ttggtggagc tgtgggcgag ccgttcggag 780
gtccgctga                                     789

```

<210> 29

<211> 741

<212> DNA

<213> *Thermotoga maritima*

<400> 29

```

ttgtacctcc tcgtggacgt gggtaacacg cattctgtct tctctatcac cgaagatggg 60
aaaacttttca gaagggtggag gctgtccacc ggtgtgtttc agacggaaga cgaactcttt 120
tcacaccttc atcctcttct gggcgatgct atgcgtgaga taaaggggat aggagtggcc 180
tccgtcgttc ccactcagaa cacagtcata gagcgttttt ctcaaaagta tttccacata 240
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gaagtgggtg ctgatagggt ggccaacggt gtcgctttcg tcaaggaata cggtaaaaac 360
ggaatcatca tcgacatggg aacggcaacc accgtggatc ttgttgtaaa cggatcttac 420
gaaggaggag ccattttgcc tggattcttc atgatgggtc actcgctctt tcggggaacg 480
gcaaaacttc cgctcgttga ggtaaaacca gcggattttg ttgtaggaaa ggatacggag 540
gaaaacatca ggctgggtgt ggtgaacgga agtgtctacg ctcttgaggg gataataggg 600
cgaataaagg aagtttacgg tgatttaccg gtggttctca cgggaggtca gtcgaagatc 660
gtgaaagata tgataaaaca cgagattttc gatgaggacc tcacgatcaa gggggtgtac 720
catttctgct tcggagattg a                                     741

```

<210> 30

<211> 822

<212> DNA

<213> *Treponema pallidum*

<400> 30

```

atgcttttga tagacgtagg gaactcgcac gtagtggttcg gaatccaagg cgagaatggg 60
ggccgtgtgt gcgtgcgtga gttgtttcgc cttgcgcctg acgcgcgtaa aaccaagat 120
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cgtgatgcgt ttatttcttc cgctcgtgcct gtgttgacaa agaccattgc agatgcggtc 240
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gcggcctatg tgcatttccg ttctgcttgc gtggttagtg attgtggaac agcgcctacc 420
tttacggcgg tggatggcac ggggttgatt caaggggtgg caattgcgcc tgggtctgcg 480
actgcgggtg agtctctcca tacaggaacg gcacaattac cacttggtcc tcttgccctg 540
cctgattccg ttctgggcaa ggatactacg catgcgggtg aggcgggtgt ggtgcggggc 600
acgctctttg ttattcgcgc tatgattgca cagtgtcaga aagagttagg gtgccgctgt 660
gcagcgggtg taacgggggg gctttcgcgt cttttctcgt cagaggtgga ctttcctcct 720
atcgatgcac agctgacgct ctcaggtctt gcacatattg cgcggctggt gccgacatct 780
ctcctgccac ctgctacagt gtcagggttca tcggggaatt ga                                     822

```

<210> 31

<211> 789

<212> DNA

<213> *Borrelia burgdorferi*

<400> 31

```

atgaataaac ctttattatc agaattgata attgatattg gaaataaccag cattgctttt 60
gccttattta aagataatca agttaattta tttattaaaa tgaaaacaaa tcttatgtta 120
aggatgatg aggtttatag cttttttgaa gaaaattttg attttaatgt aaataaagtt 180
tttataagca gcgttggttc tattcttaat gaaacattta aaaatgtcat tttttctttt 240
tttaagataa agcctttgtt tattgggtttt gatttgaatt atgatttgac atttaatcct 300

```



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tacaaaagcg ataaatTTTT gctagggttca gacgtttttg ccaatcttgt tgcagccatt 360
gaaaattatt catttgaaaa tgttttagta gtagaccttg gaactgcttg caccattttt 420
gctgttagca ggcaagatgg aatactcggg ggtattataa attctgggtc tttgataaat 480
tttaattctt tattagataa tgcctatctt atcaaaaaat tccccattag cactccaaat 540
aatcttttag agagaacgac atctgggagt gtaaacagcg gtttatttta tcaatataag 600
tatttaatag aagggtgttta tcgtgatatt aagcagatgt ataaaaaaa atttaattta 660
ataattactg ggggtaatgc ggacctaat ttgtcattaa ttgagataga gtttattttt 720
aatattcatt taactgtaga aggcgttaga atttttagga attctattga ctttaagttt 780
gttaattga 789

```

<210> 32

<211> 690

<212> DNA

<213> Aquifex aeolicus

<400> 32

```

atgaggTTTT tgacggtaga cgtagggaat tcctccgttg atatcgccct atgggaaggg 60
aagaaagtaa aagattttct gaaactttca cacgaagaat ttttaaagga agaatttcct 120
aaattaaaag cgctcggaat atccgtaaaa cagagtttta gcgaaaaagt aaggggaaaa 180
ataccgaaga taaagtTTTT aaagaaggaa aactttccta tacagggtga ttacaaaact 240
cctgaaacgc tgggcacgga cagggttagca cttgcttact ccgcaaaaaa gttttacgga 300
aagaatgttg tagtaatcag tgcgggtact gcccttgtaa ttgacctagt tcttgagggc 360
aaatttaagg gagggtttat taccttagga cttggaaaga agttaaaaaat tctttccgac 420
ctggcggagg gaattcccga gttttttccc gaagaggtag aaatttttct tgggcgttct 480
acacgagagt gcgtcctggg aggggcttac agggagagca cagaatttat taaaagtaca 540
ctgaaactct ggagaaaagt atttaaaaga aagttcaaag tgggtataac gggcggagag 600
gggaagtact tttccaagtt cggtatTTac gaccactcc ttgttcacag gggcatgaga 660
aatttacttt acctctatca caggatttaa 690

```

<210> 33

<211> 774

<212> DNA

<213> Synechocystis sp.

<400> 33

```

gtggaaacat caaagccggg ttgtggTTta gccctggata atgacaagca aaaaccttgg 60
ttaggcctaa tgataggcaa ctcccgtctg cactgggcat attgtagcgg caatgctccc 120
ctgcaaacct gggttacaga ttacaacccc aagtcagctc agttgccggg tttgttgggg 180
aaagttcctc tgatgttggc atcgggtgga ccggaacaaa ccgaagtTTg gcgagtatat 240
cagcctaaaa ttttgaccct gaagaatctt cccctggtca atctttaccc cagctttggc 300
attgaccggg ccctggctgg tttagggacg gggctgacct acggctttcc ctgtctagt 360
gttgatggag gcactgcttt gaccattaca gggtttgacc aagataaaaa actggtgggg 420
ggagcgatct tgcccggttt gggattgcag ttagcaaccc ttggcgatcg cctggcggcc 480
ctaccgaagt tagaaatgga tcaattaacc gagttgcctg accgttgggc tttagatacc 540
cccagcgcca tttttagtgg tgttgtctat ggcgtgttgg gggcattgca gagttatctc 600
caggattggc aaaagctttt tcctgggtgcc gccatggtta tcaccggggg agacggcaag 660
atattacatg gcttcctaaa agagcattct cctaattctt cggtggcctg ggatgacaat 720
ttgatcttcc tcgggtatggc ggccatacac cacggcgatc gccccatctg ttag 774

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<210> 34

<211> 672

<212> DNA

<213> Helicobacter pylori

<400> 34

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atgccagcta ggcaatcttt caaggattta aaagacttga ttttatgcga tataggcaac 60
acacgcatcc atttcgcgca aaactaccag ctcttttcaa gcgctaaaga agatttaaag 120
cgtttgggta ttcaaaagga aattttttac attagtgtga atgaagaaaa tgaaaaagct 180
cttttaaaatt gttaccctaa cgctaaaaat atcgcagggt tttttcattt agaaaccgac 240
tatatagggc ttgggataga ccggcaaatg gcatgtttag cggtggTTaa tggggttata 300

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gtggatgctg	ggagcgcgat	tacgattgat	ttagtcaaag	agggcaagca	tttaggaggg	360
tgtatTTTTgc	ccggttttagc	ccaatatgtc	catgcgtata	aaaaaagcgc	gaaaatctta	420
gagcaacctt	tcaaagcctt	agattcttta	gaagttttac	ccaaaaacac	cagagacgct	480
gtgaattacg	gcatgatttt	gagtatcatc	tcttgtatcc	aacatttagc	taaagatcaa	540
aaaatctatc	tttgtggggg	cgatgcgaaa	tatttgagcg	cgtttttacc	tcattctgtt	600
tgcaaggagc	gtttgggttt	tgacgggatg	gaaatcgctc	ttaaaaaagc	agggatacta	660
gaatgcaa	ga					672

<210> 35

<211> 747

<212> DNA

<213> *Pseudomonas aeruginosa*

<400> 35

atgattcttg	agctcgactg	tggaaactcg	ctgatcaagt	ggcgggtcat	cgagggggcg	60
gcgcgggtcg	tcgccggtgg	ccttgccggag	tccgatgatg	ccctgggtcg	acagttaacg	120
tcgcagcaag	cgctgccagt	gcgagcctgt	cgctggtga	gcgttcgcag	cgagcaggaa	180
acctcgcaac	tggtcgcacg	gttgagcag	ctgttcccgg	tttcggcgct	ggttgcata	240
tccggcaagc	agttggcggg	tgtgcgcaac	ggctatctcg	attaccagcg	cctggggctc	300
gaccgctggc	tggccctcgt	cgcggtcat	cacctggcta	agaaggcctg	cctgggtcatt	360
gatctgggga	ccgcggtcac	ctctgacctg	gtcgcggcgg	atggagtga	tctggggggc	420
tacatatgcc	cgggcatgac	cctgatgaga	agccagttgc	gcacccatac	ccgacgtatc	480
cgctacgacg	atgcagaggc	ccggcggggc	cttgccagtc	tccagccagg	gcaggccacg	540
gccgaggcgg	ttgagcgggg	ttgtctgctc	atgctcaggg	ggttcgttcg	tgagcagtac	600
gccatggcgt	gcgagctgct	cggtccggat	tgtgaaatat	tcctgacggg	tggggatgcc	660
gaactgggtc	gcgacgaact	ggctggcgcc	cggatcatgc	cggacctggt	tttcgtaggg	720
ctggcactgg	cttgcccgat	tgagtga				747

<210> 36

<211> 630

<212> DNA

<213> *Campylobacter jejuni*

<400> 36

atgttgctct	gtgatattgg	gaattcaa	gctaatttcc	tagatgataa	caaatatatt	60
actcttaata	tagatcagtt	tttagaatt	aaaaatgaac	aaaaaatttt	ttatatcaat	120
gtcaatgaac	atctcaaaga	acatttaaaa	aatcaaaaaa	attttatcaa	tcttgaacct	180
tattttttat	ttgatacaat	ttatcaagga	ttaggaatcg	atcgcatagc	agcttggtat	240
actattgaag	atggagttgt	tgtagatgca	ggtagtgtca	ttacaattga	tattatttct	300
aattctatac	atcttggtgg	ttttatcttg	ccaggtattg	caaattataa	aaaaatttat	360
agccatattt	caccacgatt	aaaaagtga	tttaacactc	aagttagtct	tgatgcattc	420
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aaagatgccg	ctcaaaaata	aaagctttat	ttcactgggt	gagatgggca	attttttagca	540
aattatttct	atcacgcaat	ttatgataaa	cttttaattc	ttcgaggaat	gaaaaagatt	600
ataaaagaaa	atcccaattt	actttattaa				630

<210> 37

<211> 1779

<212> DNA

<213> *Neisseria meningitidis*

<400> 37

atgacgggtt	tgaagccttc	gcactggcgg	gtgttgccgg	agcttgccga	cggtttgccg	60
caacacgtct	cgcaactggc	gcgtatggcg	gatatgaagc	cgagcagct	caacgggttt	120
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ggttttcaga	cggcattgaa	gcacgagtgc	gcgtccagca	acgacgagat	actggaattg	300
gcgcggattg	cgccggacaa	ggcgcacaaa	accatatgtg	tgaccacact	gcaaagtaag	360
ggcagggggc	ggcagggggc	gaagtggctc	caccgtttgg	gcgagtgtct	gatgttcagt	420
tttggctggg	tgtttgaccg	gccgcagtat	gagttgggtt	cgctgtcgcc	tgttgccggc	480
gtggcgtgcc	ggcgcgcctt	gtcgcgtttg	ggtttgaaaa	cgcaaatcaa	gtggccaaac	540

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gatttggtcg tcggacgcga caaattgggc ggcattctga ttgaaacggt caggacgggc 600
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aacgccgctt ccgtgcaatc gctgtttcag acggcatcgc ggccgggaaa tgccgatgcc 720
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<210> 38
 <211> 804
 <212> DNA
 <213> Bordetella pertussis

```

<400> 38
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caccgcgcgc tgcgtggtggc cagtttcggc acggccacca cgctggacac catcgggccc 420
gacaatgtct tcccggcggg gctgatcctg cccggccccg ccatgatgcg cggcgcgctg 480
gcctacggca ccgcccacct gcccttgccc gacggcctgg tggccgacta ccccatcgac 540
acccatcagg ccatcgccag cggcatcgcc gccgcccagg ccggcgcgat cgtgcggcaa 600
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tggcccgaag tgcggcagga agccgagcgc ctgctggcgg tcaccggcgc cgccttcggc 720
gccacgccgc agcccactta cctcgacagc cccgtgctcg acggcctggc ggcgctcgcc 780
gcgcaaggcg cgccaacggc ctga 804

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<210> 39
 <211> 460
 <212> PRT
 <213> Neisseria gonorrhoeae

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<400> 39
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Gln Tyr Glu Leu Gly Ser Leu Ser Pro Val Ala Ala Leu Ala Cys Arg
          20           25           30
Arg Ala Leu Gly Cys Leu Gly Leu Glu Thr Gln Ile Lys Trp Pro Asn
          35           40           45
Asp Leu Val Val Gly Arg Asp Lys Leu Gly Gly Ile Leu Ile Glu Thr

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50					55					60					
Val	Arg	Ala	Gly	Gly	Lys	Thr	Val	Ala	Val	Val	Gly	Ile	Gly	Ile	Asn
65					70					75					80
Phe	Val	Leu	Pro	Lys	Glu	Val	Glu	Asn	Ala	Ala	Ser	Val	Gln	Ser	Leu
				85					90					95	
Phe	Gln	Thr	Ala	Ser	Arg	Arg	Gly	Asn	Ala	Asp	Ala	Ala	Val	Leu	Leu
			100					105					110		
Glu	Thr	Leu	Leu	Ala	Glu	Leu	Gly	Ala	Val	Leu	Glu	Gln	Tyr	Ala	Glu
		115					120					125			
Glu	Gly	Phe	Ala	Pro	Phe	Leu	Asn	Glu	Tyr	Glu	Thr	Ala	Asn	Arg	Asp
	130					135					140				
His	Gly	Lys	Ala	Val	Leu	Leu	Leu	Arg	Asp	Gly	Glu	Thr	Val	Cys	Glu
145					150					155					160
Gly	Thr	Val	Lys	Gly	Val	Asp	Gly	Arg	Gly	Val	Leu	His	Leu	Glu	Thr
				165					170					175	
Ala	Glu	Gly	Glu	Gln	Thr	Val	Val	Ser	Gly	Glu	Ile	Ser	Leu	Arg	Pro
			180					185						190	
Asp	Asn	Arg	Ser	Val	Ser	Val	Pro	Lys	Arg	Pro	Asp	Ser	Glu	Arg	Phe
		195					200					205			
Leu	Leu	Leu	Glu	Gly	Gly	Asn	Ser	Arg	Leu	Lys	Trp	Ala	Trp	Val	Glu
	210					215					220				
Asn	Gly	Thr	Phe	Ala	Thr	Val	Gly	Ser	Ala	Pro	Tyr	Arg	Asp	Leu	Ser
225					230					235					240
Pro	Leu	Gly	Ala	Glu	Trp	Ala	Glu	Lys	Ala	Asp	Gly	Asn	Val	Arg	Ile
			245						250					255	
Val	Gly	Cys	Ala	Val	Cys	Gly	Glu	Ser	Lys	Lys	Ala	Gln	Val	Lys	Glu
			260					265					270		
Gln	Leu	Ala	Arg	Lys	Ile	Glu	Trp	Leu	Pro	Ser	Ser	Ala	Gln	Ala	Leu
		275					280					285			
Gly	Ile	Arg	Asn	His	Tyr	Arg	His	Pro	Glu	Glu	His	Gly	Ser	Asp	Arg
	290					295					300				
Trp	Phe	Asn	Ala	Leu	Gly	Ser	Arg	Arg	Phe	Ser	Arg	Asn	Ala	Cys	Val
305					310					315					320
Val	Val	Ser	Cys	Gly	Thr	Ala	Val	Thr	Val	Asp	Ala	Leu	Thr	Asp	Asp
				325					330					335	
Gly	His	Tyr	Leu	Gly	Gly	Thr	Ile	Met	Pro	Gly	Phe	His	Leu	Met	Lys
			340					345					350		
Glu	Ser	Leu	Ala	Val	Arg	Thr	Ala	Asn	Leu	Asn	Arg	Pro	Ala	Gly	Lys
		355					360					365			
Arg	Tyr	Pro	Phe	Pro	Thr	Thr	Thr	Gly	Asn	Ala	Val	Ala	Ser	Gly	Met
	370					375					380				

Met Asp Ala Val Cys Gly Ser Ile Met Met Met His Gly Arg Leu Lys
385 390 395 400

Glu Lys Asn Gly Ala Gly Lys Pro Val Asp Val Ile Ile Thr Gly Gly
405 410 415

Gly Ala Ala Lys Val Ala Glu Ala Leu Pro Pro Ala Phe Leu Ala Glu
420 425 430

Asn Thr Val Arg Val Ala Asp Asn Leu Val Ile His Gly Leu Leu Asn
435 440 445

Leu Ile Ala Ala Glu Gly Gly Glu Ser Glu His Ala
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<210> 40

<211> 1383

<212> DNA

<213> Neisseria gonorrhoeae

<400> 40

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gaaacgcaaa	tcaagtggcc	aaacgatttg	gtcgtcggac	gcgacaaatt	gggcggcatt	180
ctgattgaaa	cagtcagggc	gggcggtaaa	acggttgccc	tggtcggtat	cggcatcaat	240
ttcgtgctgc	ccaaggaagt	ggaaaacgcc	gcttccgtgc	agtcgctgtt	tcagacggca	300
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gcggtgttgg	aacaatatgc	ggaagaaggg	ttcgcgccat	ttttaaatga	gtatgaaacg	420
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gtcgccgaag	ccctgccgcc	tgcatTTTTT	gcggaaaata	ccgtgcgcgt	ggcgggacaac	1320
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taa						1383

<210> 41

<211> 244

<212> PRT

<213> Porphyromonas gingivalis

<400> 41

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Ala Phe Val Arg Asn Asn Ser Ile Glu Ser Ile Ser Phe Leu Pro Gly
20 25 30

Lys Ala Gly Gln Ala Leu Ser His Leu Val Ala Pro His Arg Phe Asp

35					40					45					
Lys	Ala	Ile	Tyr	Ser	Ser	Val	Gly	Leu	Pro	Asp	Glu	Glu	Ala	Glu	Ala
50					55					60					
Ile	Val	Arg	Ser	Cys	Ala	Ala	Ala	Ser	Leu	Met	Met	Gly	Thr	Glu	Thr
65					70					75					80
Pro	Val	Pro	Leu	Arg	Leu	Gln	Tyr	Asp	Arg	Arg	Thr	Leu	Gly	Ala	Asp
				85					90					95	
Arg	Leu	Ala	Ala	Val	Val	Gly	Ala	His	Ser	Leu	Tyr	Pro	Asn	Thr	Glu
			100					105					110		
Leu	Leu	Val	Ile	Asp	Ala	Gly	Thr	Ala	Ile	Thr	Tyr	Glu	Arg	Val	Ser
		115					120					125			
Ala	Glu	Gly	Ile	Tyr	Leu	Gly	Gly	Asn	Ile	Ser	Pro	Gly	Leu	His	Leu
	130					135					140				
Arg	Phe	Lys	Ala	Leu	His	Leu	Phe	Thr	Gly	Arg	Leu	Pro	Leu	Ile	Asp
145					150					155					160
Pro	Ser	Gly	Ile	Ser	Pro	Lys	Ile	Ala	Glu	Tyr	Gly	Ser	Ser	Thr	Glu
				165					170					175	
Glu	Ala	Ile	Thr	Ala	Gly	Val	Ile	His	Gly	Leu	Ala	Gly	Glu	Ile	Asp
			180					185					190		
Arg	Tyr	Ile	Asp	Asp	Leu	His	Ala	Lys	Glu	Gly	Arg	Ser	Ala	Val	Ile
		195					200					205			
Leu	Thr	Gly	Gly	Asp	Ala	Asn	Tyr	Leu	Ala	Arg	Ile	Ile	Arg	Ser	Gly
	210					215					220				
Ile	Leu	Ile	His	Pro	Asp	Leu	Val	Leu	Leu	Gly	Leu	Asn	Arg	Ile	Leu
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Glu Tyr Asn Val															

<210> 42

<211> 735

<212> DNA

<213> Porphyromonas gingivalis

<400> 42

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gaggctgaag ctattgtgag aagttgtgca gctgcttcct tgatgatggg gactgagacc 240
cccgtacccc ttcgcctgca atatgatcgc cgcacttttg gtgccgaccg actggctgcg 300
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gccggagtaa ttcattggcct ggcaggggag atagacagat atattgacga tctgcacgct 600
aaagaggggc ggtctgccgt tatactgacc ggaggagatg ccaactatth ggacaggatt 660
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gaatataatg tataa 735

```


<210> 43
 <211> 592
 <212> PRT
 <213> Neisseria meningitidis

<400> 43
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 Asp Gly Leu Pro Gln His Val Ser Gln Leu Ala Arg Met Ala Asp Met
 20 25 30
 Lys Pro Gln Gln Leu Asn Gly Phe Trp Gln Gln Met Pro Ala His Ile
 35 40 45
 Arg Gly Leu Leu Arg Gln His Asp Gly Tyr Trp Arg Leu Val Arg Pro
 50 55 60
 Leu Ala Val Phe Asp Ala Glu Gly Leu Arg Glu Leu Gly Glu Arg Ser
 65 70 75 80
 Gly Phe Gln Thr Ala Leu Lys His Glu Cys Ala Ser Ser Asn Asp Glu
 85 90 95
 Ile Leu Glu Leu Ala Arg Ile Ala Pro Asp Lys Ala His Lys Thr Ile
 100 105 110
 Cys Val Thr His Leu Gln Ser Lys Gly Arg Gly Arg Gln Gly Arg Lys
 115 120 125
 Trp Ser His Arg Leu Gly Glu Cys Leu Met Phe Ser Phe Gly Trp Val
 130 135 140
 Phe Asp Arg Pro Gln Tyr Glu Leu Gly Ser Leu Ser Pro Val Ala Ala
 145 150 155 160
 Val Ala Cys Arg Arg Ala Leu Ser Arg Leu Gly Leu Asp Val Gln Ile
 165 170 175
 Lys Trp Pro Asn Asp Leu Val Val Gly Arg Asp Lys Leu Gly Gly Ile
 180 185 190
 Leu Ile Glu Thr Val Arg Thr Gly Gly Lys Thr Val Ala Val Val Gly
 195 200 205
 Ile Gly Ile Asn Phe Val Leu Pro Lys Glu Val Glu Asn Ala Ala Ser
 210 215 220
 Val Gln Ser Leu Phe Gln Thr Ala Ser Arg Arg Gly Asn Ala Asp Ala
 225 230 235 240
 Ala Val Leu Leu Glu Thr Leu Leu Val Glu Leu Asp Ala Val Leu Leu
 245 250 255
 Gln Tyr Ala Arg Asp Gly Phe Ala Pro Phe Val Ala Glu Tyr Gln Ala
 260 265 270
 Ala Asn Arg Asp His Gly Lys Ala Val Leu Leu Leu Arg Asp Gly Glu
 275 280 285

Thr Val Phe Glu Gly Thr Val Lys Gly Val Asp Gly Gln Gly Val Leu
 290 295 300
 His Leu Glu Thr Ala Glu Gly Lys Gln Thr Val Val Ser Gly Glu Ile
 305 310 315 320
 Ser Leu Arg Ser Asp Asp Arg Pro Val Ser Val Pro Lys Arg Arg Asp
 325 330 335
 Ser Glu Arg Phe Leu Leu Leu Asp Gly Gly Asn Ser Arg Leu Lys Trp
 340 345 350
 Ala Trp Val Glu Asn Gly Thr Phe Ala Thr Val Gly Ser Ala Pro Tyr
 355 360 365
 Arg Asp Leu Ser Pro Leu Gly Ala Glu Trp Ala Glu Lys Ala Asp Gly
 370 375 380
 Asn Val Arg Ile Val Gly Cys Ala Val Cys Gly Glu Phe Lys Lys Ala
 385 390 395 400
 Gln Val Gln Glu Gln Leu Ala Arg Lys Ile Glu Trp Leu Pro Ser Ser
 405 410 415
 Ala Gln Ala Leu Gly Ile Arg Asn His Tyr Arg His Pro Glu Glu His
 420 425 430
 Gly Ser Asp Arg Trp Phe Asn Ala Leu Gly Ser Arg Arg Phe Ser Arg
 435 440 445
 Asn Ala Cys Val Val Val Ser Cys Gly Thr Ala Val Thr Val Asp Ala
 450 455 460
 Leu Thr Asp Asp Gly His Tyr Leu Gly Gly Thr Ile Met Pro Gly Phe
 465 470 475 480
 His Leu Met Lys Glu Ser Leu Ala Val Arg Thr Ala Asn Leu Asn Arg
 485 490 495
 His Ala Gly Lys Arg Tyr Pro Phe Pro Thr Thr Thr Gly Asn Ala Val
 500 505 510
 Ala Ser Gly Met Met Asp Ala Val Cys Gly Ser Val Met Met Met His
 515 520 525
 Gly Arg Leu Lys Glu Lys Thr Gly Ala Gly Lys Pro Val Asp Val Ile
 530 535 540
 Ile Thr Gly Gly Gly Ala Ala Lys Val Ala Glu Ala Leu Pro Pro Ala
 545 550 555 560
 Phe Leu Ala Glu Asn Thr Val Arg Val Ala Asp Asn Leu Val Ile Tyr
 565 570 575
 Gly Leu Leu Asn Met Ile Ala Ala Glu Gly Arg Glu Tyr Glu His Ile
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<210> 44

<211> 1779

<212> DNA

<213> *Neisseria meningitidis*

<400> 44

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tggcagcaga tgccggcgca catacgcggg ctggttgcgc aacacgacgg ctattggcgg 180
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gtcgatgtca tcattaccgg cggcggcgcg gcaaaagttg ccgaagccct gccgcctgca 1680
tttttggcgg aaaataccgt gcgcgtggcg gacaacctcg tcatttacgg gttgttgaac 1740
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```

<210> 45

<211> 262

<212> PRT

<213> *Bacillus anthracis*

<400> 45

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Met Ile Phe Val Leu Asp Val Gly Asn Thr Asn Ala Val Leu Gly Val
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Phe Glu Glu Gly Glu Leu Arg Gln His Trp Arg Met Glu Thr Asp Arg
      20             25             30

His Lys Thr Glu Asp Glu Tyr Gly Met Leu Val Lys Gln Leu Leu Glu
      35             40             45

His Glu Gly Leu Ser Phe Glu Asp Val Lys Gly Ile Ile Val Ser Ser
      50             55             60

Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Glu Lys Tyr
      65             70             75             80

Phe Lys Ile Lys Pro Leu Val Val Gly Pro Gly Ile Lys Thr Gly Leu
      85             90             95

Asn Ile Lys Tyr Glu Asn Pro Arg Glu Val Gly Ala Asp Arg Ile Val
      100            105            110

```

Asn Ala Val Ala Gly Ile His Leu Tyr Gly Ser Pro Leu Ile Ile Val
 115 120 125
 Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asn Glu Glu Lys His
 130 135 140
 Tyr Met Gly Gly Val Ile Thr Pro Gly Ile Met Ile Ser Ala Glu Ala
 145 150 155 160
 Leu Tyr Ser Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Thr Lys Pro
 165 170 175
 Ser Ser Val Val Gly Lys Asn Thr Val Ser Ala Met Gln Ser Gly Ile
 180 185 190
 Leu Tyr Gly Tyr Val Gly Gln Val Glu Gly Ile Val Lys Arg Met Lys
 195 200 205
 Glu Glu Ala Lys Gln Glu Pro Lys Val Ile Ala Thr Gly Gly Leu Ala
 210 215 220
 Lys Leu Ile Ser Glu Glu Ser Asn Val Ile Asp Val Val Asp Pro Phe
 225 230 235 240
 Leu Thr Leu Lys Gly Leu Tyr Met Leu Tyr Glu Arg Asn Ala Asn Leu
 245 250 255
 Gln His Glu Lys Gly Glu
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<210> 46
 <211> 789
 <212> DNA
 <213> Bacillus anthracis

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 gaaaatccac gtgaagtagg tgcggatcga atcgtaaattg cagtagcagg gatccactta 360
 tatggaagtc cgcttattat tgtcgatttt ggtacggcta ctacatattg ttatattaac 420
 gaagaaaagc attatatggg tggagttatt acaccgggaa ttatgatttc agcagagggt 480
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 gggaagaata cggtaagtgc gatgcaatct ggtattcttt atgggttatgt tggacaagtg 600
 gaaggatttg ttaagcgcac gaaagaggaa gctaaacaag aaccgaaagt tattgcaaca 660
 ggtggatttg cgaaattaat ttcagaagaa tcgaatgtga ttgatgttgt agatccattt 720
 ttaacattaa aaggtttgta tatgttatac gagcgggaatg caaatttaca gcatgagaaa 780
 ggtgaataa 789

<210> 47
 <211> 254
 <212> PRT
 <213> Bacillus halodurans

<400> 47
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Tyr Gln Asp Glu Thr Leu Val His His Trp Arg Leu Ala Thr Ser Arg
 20 25 30
 Gln Lys Thr Glu Asp Glu Tyr Ala Met Thr Val Arg Ser Leu Phe Asp
 35 40 45
 His Ala Gly Leu Gln Phe Gln Asp Ile Asp Gly Ile Val Ile Ser Ser
 50 55 60
 Val Val Pro Pro Met Met Phe Ser Leu Glu Gln Met Cys Lys Lys Tyr
 65 70 75 80
 Phe His Val Thr Pro Met Ile Ile Gly Pro Gly Ile Lys Thr Gly Leu
 85 90 95
 Asn Ile Lys Tyr Asp Asn Pro Lys Glu Val Gly Ala Asp Arg Ile Val
 100 105 110
 Asn Ala Val Ala Ala Ile Glu Leu Tyr Gly Tyr Pro Ala Ile Val Val
 115 120 125
 Asp Phe Gly Thr Ala Thr Thr Tyr Cys Leu Ile Asn Glu Lys Lys Gln
 130 135 140
 Tyr Ala Gly Gly Val Ile Ala Pro Gly Ile Met Ile Ser Thr Glu Ala
 145 150 155 160
 Leu Tyr His Arg Ala Ser Lys Leu Pro Arg Ile Glu Ile Ala Lys Pro
 165 170 175
 Lys Gln Val Val Gly Thr Asn Thr Ile Asp Ser Met Gln Ser Gly Ile
 180 185 190
 Phe Tyr Gly Tyr Val Ser Gln Val Asp Gly Val Val Lys Arg Met Lys
 195 200 205
 Ala Gln Ala Glu Ser Glu Pro Lys Val Ile Ala Thr Gly Gly Leu Ala
 210 215 220
 Lys Leu Ile Gly Thr Glu Ser Glu Thr Ile Asp Val Ile Asp Ser Phe
 225 230 235 240
 Leu Thr Leu Lys Gly Leu Gln Leu Ile Tyr Lys Lys Asn Val
 245 250

<210> 48

<211> 765

<212> DNA

<213> Bacillus halodurans

<400> 48

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 tatggctacc ctgccattgt cgttgatttt ggaacagcaa caacatattg ctttaattaat 420
 gaaaaaaaaac aatatgcagg gggagtcatt gtccttgaa tcatgatctc aacagaagcg 480
 ttgtatcatc gcgcatcaaa attgccacgg attgaaatag cgaagccgaa acaagtcgta 540

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ggtgggcttg cgaagttaat cggaaccgag tcggaaacca ttgatgtaat cgattcgttt 720
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```

<210> 49

<211> 258

<212> PRT

<213> Bacillus stearothermophilus

<400> 49

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Met Ile Phe Val Leu Asp Val Gly Asn Thr Asn Thr Val Leu Gly Val
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```

Tyr Asp Gly Asp Glu Leu Lys His His Trp Arg Ile Glu Thr Ser Arg
          20           25           30

```

```

Ser Lys Thr Glu Asp Glu Tyr Gly Met Met Ile Lys Ala Leu Leu Asn
          35           40           45

```

```

His Val Gly Leu Gln Phe Ser Asp Ile Arg Gly Ile Ile Ile Ser Ser
          50           55           60

```

```

Val Val Pro Pro Ile Met Phe Ala Leu Glu Arg Met Cys Leu Lys Tyr
  65           70           75           80

```

```

Phe His Ile Lys Pro Leu Ile Val Gly Pro Gly Ile Lys Thr Gly Leu
          85           90           95

```

```

Asp Ile Lys Tyr Asp Asn Pro Arg Glu Val Gly Ala Asp Arg Ile Val
          100          105          110

```

```

Asn Ala Val Ala Gly Ile His Leu Tyr Gly Ser Pro Leu Ile Ile Val
          115          120          125

```

```

Asp Phe Gly Thr Ala Thr Thr Tyr Cys Tyr Ile Asn Glu His Lys Gln
          130          135          140

```

```

Tyr Met Gly Gly Ala Ile Ala Pro Gly Ile Met Ile Ser Thr Glu Ala
          145          150          155          160

```

```

Leu Phe Ala Arg Ala Ala Lys Leu Pro Arg Ile Glu Ile Ala Arg Pro
          165          170          175

```

```

Asp Asp Ile Ile Gly Lys Asn Thr Val Ser Ala Met Gln Ala Gly Ile
          180          185          190

```

```

Leu Tyr Gly Tyr Val Gly Gln Val Glu Gly Ile Val Ser Arg Met Lys
          195          200          205

```

```

Ala Lys Ser Lys Ile Pro Pro Lys Val Ile Ala Thr Gly Gly Leu Ala
          210          215          220

```

```

Pro Leu Ile Ala Ser Glu Ser Asp Ile Ile Asp Val Val Asp Pro Phe
          225          230          235          240

```

```

Leu Thr Leu Thr Gly Leu Lys Leu Leu Tyr Glu Lys Asn Thr Glu Lys
          245          250          255

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Lys Gly

<210> 50
 <211> 777
 <212> DNA
 <213> *Bacillus stearothermophilus*

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 ttccatatca aaccgctcat cgtcgggtccg ggcattaaaa ccgggctcga catcaaatat 300
 gacaatccgc gtgaggtggg cgccgaccgg attgtcaacg cggttgccgg catccatttg 360
 tacggcagtc cgctgattat cgtcgatttt ggcacggcga cgacgtattg ttatattaat 420
 gaacataaac aatatatggg agggggccatt gccccgggaa ttatgatctc gacagagggt 480
 ctgtttgcgc gggcggcgaa attgccgcgc attgaaatcg cccgcccgga tgatatcatc 540
 ggcaaaaata cggtcagcgc catgcaagcc ggtattttat acggttatgt cggacaagtg 600
 gaaggcatcg tgtcgcgaat gaaggcgaaa agcaaaatcc cgccgaaggt gattgctact 660
 ggcggttttg ctccgctcat tgccagcgaa tcggacatca tcgatgtcgt tgatccgttt 720
 ttgacgctga ctggcttaaa attgttgtac gagaaaaaca ccgagaaaaa aggatga 777

<210> 51
 <211> 260
 <212> PRT
 <213> *Caulobacter crescentus*

<400> 51
 Met Leu Leu Ala Ile Glu Gln Gly Asn Thr Asn Thr Met Phe Ala Ile
 1 5 10 15
 His Asp Gly Ala Ser Trp Val Ala Gln Trp Arg Ser Ala Thr Glu Ser
 20 25 30
 Thr Arg Thr Ala Asp Glu Tyr Val Val Trp Leu Ser Gln Leu Leu Ser
 35 40 45
 Met Gln Gly Leu Gly Phe Arg Ala Ile Asp Ala Val Ile Ile Ser Ser
 50 55 60
 Val Val Pro Gln Ser Ile Phe Asn Leu Arg Asn Leu Ser Arg Arg Tyr
 65 70 75 80
 Phe Asn Val Glu Pro Leu Val Ile Gly Glu Asn Ala Lys Leu Gly Ile
 85 90 95
 Asp Val Arg Ile Glu Lys Pro Ser Glu Ala Gly Ala Asp Arg Leu Val
 100 105 110
 Asn Ala Ile Gly Ala Ala Met Val Tyr Pro Gly Pro Leu Val Val Ile
 115 120 125
 Asp Ser Gly Thr Ala Thr Thr Phe Asp Ile Val Ala Ala Asp Gly Ala
 130 135 140
 Phe Glu Gly Gly Ile Ile Ala Pro Gly Ile Asn Leu Ser Met Gln Ala
 145 150 155 160
 Leu His Glu Ala Ala Ala Lys Leu Pro Arg Ile Ala Ile Gln Arg Pro
 165 170 175

Ala Gly Asn Arg Ile Val Gly Thr Asp Thr Val Ser Ala Met Gln Ser
180 185 190

Gly Val Phe Trp Gly Tyr Ile Ser Leu Ile Glu Gly Leu Val Ala Arg
195 200 205

Ile Lys Ala Glu Arg Gly Glu Pro Met Thr Val Ile Ala Thr Gly Gly
210 215 220

Val Ala Ser Leu Phe Glu Gly Ala Thr Asp Ser Ile Asp His Phe Asp
225 230 235 240

Ser Asp Leu Thr Ile Arg Gly Leu Leu Glu Ile Tyr Arg Arg Asn Thr
245 250 255

Ile Ala Glu Ser
260

<210> 52

<211> 783

<212> DNA

<213> *Caulobacter crescentus*

<400> 52

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atgctgctgg ccattgagca gggcaacacc aacaccatgt tcgccattca tgatggcgca 60
tcgtgggtcg cgcagtggcg gtcagcgacc gaaagcacgc gcacggccga tgagtacgtc 120
gtctggcttt cgcaactgct gtcgatgcag gggcttggct tccgggcat cgacgccgtg 180
atcatttcca gcgtcgtgcc gcagtcgac ttcaatctgc gcaacctgag ccgccgctac 240
ttcaacgtcg agcctctggt catcggtag aacgccaagc tgggcattga tgtccgcac 300
gagaaacct cgcaggccgg cgccgaccgc ctggtcaacg ccattggcgc ggcgatggtc 360
tatccgggtc cgctggtcgt gatcgacagc ggcaccgcca cgacgttcga catcgtggcc 420
gccgacggcg ccttcgaggg cgggattatc gcgcccggta tcaacctgtc gatgcaggct 480
ctgcacgagg cggcggcgaa gctgccgcgc atcgccatcc agcgtcccgc cggtaacagg 540
atcgtgggca cggacacggt ctccgccatg cagtccggcg tcttctgggg ctatatctcg 600
ctgatcgaag gcctcgtcgc gcggatcaag gccgagcgcg gcgagcctat gaccgttatc 660
gccacgggtg gcgtcgctc gctgttcgag ggcgcgaccg acagcattga ccacttcgac 720
tctgatctga cgatccgggg tcttctcgaa atctaccgcc gaaacaccat cgccgagtcc 780
tga 783

```

<210> 53

<211> 257

<212> PRT

<213> *Chlorobium tepidum*

<400> 53

Met Arg Leu Val Val Asp Ile Gly Asn Thr Ser Thr Thr Leu Ala Ile
1 5 10 15

Phe Thr Gly Asp Glu Glu Pro Ser Val Glu Ser Val Pro Ser Ala Leu
20 25 30

Phe Ala Asp Ser Ser Thr Met Arg Glu Val Phe Gly Asn Met Ala Arg
35 40 45

Lys His Gly Glu Pro Gln Ala Ile Ala Ile Cys Ser Val Val Pro Ser
50 55 60

Ala Thr Ala Val Gly Ser Ala Leu Leu Glu Ser Leu Phe Ser Val Pro
65 70 75 80

Val Leu Thr Ile Cys Cys Lys Leu Arg Phe Pro Phe Arg Leu Asp Tyr
85 90 95

Ala Thr Pro His Thr Phe Gly Ala Asp Arg Leu Ala Leu Cys Ala Trp
100 105 110

Ser Arg His Leu Phe Ser Glu Lys Pro Val Ile Ala Val Asp Ile Gly
115 120 125

Thr Ala Ile Thr Phe Asp Val Leu Asp Thr Val Gly Asn Tyr Arg Gly
130 135 140

Gly Leu Ile Met Pro Gly Ile Asp Met Met Ala Gly Ala Leu His Ser
145 150 155 160

Arg Thr Ala Gln Leu Pro Gln Val Arg Ile Asp Arg Pro Glu Ser Leu
165 170 175

Leu Gly Arg Ser Thr Thr Glu Cys Ile Lys Ser Gly Val Phe Trp Gly
180 185 190

Val Val Lys Gln Ile Gly Gly Leu Val Asp Ala Ile Arg Gly Asp Leu
195 200 205

Val Arg Asp Phe Gly Glu Ser Thr Val Glu Val Ile Val Thr Gly Gly
210 215 220

Asn Ser Arg Ile Ile Val Pro Glu Ile Gly Pro Val Ser Val Ile Asp
225 230 235 240

Glu Leu Ala Val Leu Arg Gly Ser Asp Leu Leu Leu Arg Met Asn Met
245 250 255

Pro

<210> 54
<211> 774
<212> DNA
<213> Chlorobium tepidum

<400> 54
gtgcggctgg tcgttgacat cggcaatacc agcacgacgt tggcgatttt caccggtgat 60
gaagagccgt cggtcgagtc ggtaccgagt gcgttggttg ccgattccag cacaatgcgc 120
gaagtgtttg gcaacatggc ccggaagcac ggcgagccac aggccatcgc catttgacgc 180
gtggtgcctt ccgctaccgc cgtcgggttcg gcgcttctcg aatcactttt ctccgtaccg 240
gtgctgacca tctgctgtaa gctccggtttt ccttttctgc tcgactacgc aaccccgcac 300
accttcggcg cggatcgctt tgccctgtgc gcatggagcc gacatctctt ttctgaaaaa 360
ccggttatcg ccgctcgatat cggcacggcc atcaccttcg acgtgctcga cacggtgggg 420
aattatcgcg gtggtctcat catgccgggt atcgacatga tggccggagc gcttcattcg 480
agaaccgccc agcttcccca ggtgcgcacg gacaggccgg agagccttct cgggcgctcg 540
acgaccgaat gcatcaaaag cggagttttc tggggagtgg tcaaacagat cggcggcctc 600
gtggacgcca ttcgcggcga ccttgtagcg gactttggcg agtcaacggt cgaagtgatt 660
gtcaccggcg gcaatagcag gattatcggt ccggagatcg gccctgtcag tgttatcgac 720
gaactcgctg tcctgcgcgg cagcgatctt ttgctgcgga tgaatatgcc gtga 774

<210> 55
<211> 256
<212> PRT
<213> Clostridium difficile

<400> 55

Met Leu Leu Val Phe Asp Val Gly Asn Thr Asn Met Val Leu Gly Ile
 1 5 10 15

Tyr Lys Gly Asp Lys Leu Val Asn Tyr Trp Arg Ile Lys Thr Asp Arg
 20 25 30

Glu Lys Thr Ser Asp Glu Tyr Gly Ile Leu Ile Ser Asn Leu Phe Asp
 35 40 45

Tyr Asp Asn Val Asn Ile Ser Asp Ile Asp Asp Val Ile Ile Ser Ser
 50 55 60

Val Val Pro Asn Val Met His Ser Leu Glu Asn Phe Cys Ile Lys Tyr
 65 70 75 80

Cys Lys Lys Gln Pro Leu Ile Val Gly Pro Gly Ile Lys Thr Gly Leu
 85 90 95

Asn Ile Lys Tyr Asp Asn Pro Lys Gln Val Gly Ala Asp Arg Ile Val
 100 105 110

Asn Ala Val Ala Gly Ile Glu Lys Tyr Gly Ala Pro Ser Ile Leu Val
 115 120 125

Asp Phe Gly Thr Ala Thr Thr Phe Cys Ala Ile Ser Glu Lys Gly Glu
 130 135 140

Tyr Leu Gly Gly Thr Ile Ala Pro Gly Ile Lys Ile Ser Ser Glu Ala
 145 150 155 160

Leu Phe Gln Ser Ala Ser Lys Leu Pro Arg Val Glu Leu Ala Lys Pro
 165 170 175

Gly Met Thr Ile Cys Lys Ser Thr Val Ser Ala Met Gln Ser Gly Ile
 180 185 190

Ile Tyr Gly Tyr Val Gly Leu Val Asp Lys Ile Ile Ser Ile Met Lys
 195 200 205

Lys Glu Leu Asn Cys Asp Asp Val Lys Val Ile Ala Thr Gly Gly Leu
 210 215 220

Ala Lys Leu Ile Ala Ser Glu Thr Lys Ser Ile Asp Tyr Val Asp Gly
 225 230 235 240

Phe Leu Thr Leu Glu Gly Leu Arg Ile Ile Tyr Glu Lys Asn Gln Glu
 245 250 255

<210> 56

<211> 771

<212> DNA

<213> Clostridium difficile

<400> 56

atgcttctag tatttgatgt tggaaatact aatatggttt taggtatata taaaggtgac 60
 aaattagtta attactggag aattaaaaca gataggga aaacgtctga tgaatatgga 120
 atcctgataa gtaacctatt tgattatgat aatgtgaata taagtatat tgatgatgtt 180
 ataatatcat ctgtagttcc gaatgttatg cattctcttg aaaacttttg tataaagtac 240


```

tgtaaaaaac agccattaat agtaggtcca ggcataaaaa caggtctaaa tataaaatat 300
gataatccaa aacaagttgg ggcagataga atagttaatg ctgtagcagg gatagaaaag 360
tatggagcac caagtatact tgttgatttt ggaacagcaa ctacattttg tgctatctct 420
gaaaaaggtg aatatttggg tggaacaata gcaccaggaa taaaaatatc tagtgaggcg 480
ttatttcaaa gtgcgtctaa attacctaga gtagaattag ctaagccagg tatgactatt 540
tgtaagagta ctgtatcagc catgcaatct ggaataattt atggatatgt tggtttagtt 600
gacaaaataa taagtattat gaagaaagaa ttgaattgtg atgatgttaa ggttatagct 660
acaggtggat tagctaaact gattgcttca gagacgaaaa gtatagatta tgtagatggt 720
tttttaacac tagaaggatt gagaataata tatgaaaaaa accaagaata a 771

```

<210> 57

<211> 219

<212> PRT

<213> Dehalococcoides ethenogenes

<400> 57

```

Met Ser Glu Lys Leu Val Ala Val Asp Ile Gly Asn Thr Ser Val Asn
  1             5             10             15

```

```

Ile Gly Ile Phe Glu Gly Glu Lys Leu Leu Ala Asn Trp His Leu Gly
          20             25             30

```

```

Ser Val Ala Gln Arg Met Ala Asp Glu Tyr Ala Ser Leu Leu Leu Gly
          35             40             45

```

```

Leu Leu Gln His Ala Gly Ile His Pro Glu Glu Leu Asn Arg Val Ile
          50             55             60

```

```

Met Cys Ser Val Val Pro Pro Leu Thr Thr Thr Phe Glu Glu Val Phe
          65             70             75             80

```

```

Lys Ser Tyr Phe Lys Ala Ala Pro Leu Val Val Gly Ala Gly Ile Lys
          85             90             95

```

```

Ser Gly Val Lys Val Arg Met Asp Asn Pro Arg Glu Val Gly Ala Asp
          100             105             110

```

```

Arg Ile Val Asn Ala Ala Ala Ala Arg Val Leu Tyr Pro Gly Ala Cys
          115             120             125

```

```

Ile Ile Val Asp Met Gly Thr Ala Thr Thr Phe Asp Thr Leu Ser Glu
          130             135             140

```

```

Gly Gly Ala Tyr Ile Gly Gly Ala Ile Ala Pro Gly Ile Ala Thr Ser
          145             150             155             160

```

```

Ala Gln Ala Ile Ala Glu Lys Thr Ser Lys Leu Pro Lys Ile Glu Ile
          165             170             175

```

```

Ile Arg Pro Ala Lys Val Ile Gly Ser Asn Thr Val Ser Ala Met Gln
          180             185             190

```

```

Ser Gly Ile Tyr Phe Gly Tyr Ile Gly Leu Val Glu Glu Leu Val Arg
          195             200             205

```

```

Arg Ile Gln Thr Glu Leu Gly Gln Lys Thr Arg
          210             215

```

<210> 58

<211> 659

<213> Dehalococcoides ethenogenes

atgtctgaaa	aactggtggc	ggtagatatc	ggcaatacca	gcgtaaatat	aggtatatatt	60
gagggcgaaa	aactgctggc	aaactggcat	ctgggttcgg	ttgcccagcg	tatggctgat	120
gaatatgcca	gtctgctctt	aggcctgttg	cagcacgccg	gtatacaccc	ggaagagcta	180
aacagggtaa	tcatgtgcag	tgttggtgccg	cccctgacca	ctacttttga	agaggatatt	240
aaaagctatt	tcaaggctgc	tcctctggta	gtgggtgcag	gtataaagag	cgggggttaag	300
gtgcgcacatgg	ataacccccg	tgagggttggg	gctgaccgca	tagtaaatgc	cgctgccgcc	360
agggtgcttt	atccgggggc	gtgcataata	gtggacatgg	gtacggccac	tacctttgat	420
accctttccg	agggtggggc	atatataggc	ggggcgattg	cacccggtat	tgccacctca	480
gcccaggcta	ttgcggaaaa	gacttcaaaa	ctgcccgaaga	ttgagataat	ccgtcctgcc	540
aaagttatcg	gctctaatac	tgtgtcggct	atgcagtcag	gtatatactt	cggttatatc	600
gggctggtgg	aagagctggt	caggcggatt	caaactgaat	tggggcagaa	aaccagagt	659

<213> Desulfovibrio vulgaris

Met 1	Thr	Gln	His	Phe 5	Leu	Leu	Phe	Asp	Ile 10	Gly	Asn	Thr	Asn	Val 15	Lys
Ile	Gly	Ile	Ala 20	Val	Glu	Thr	Ala	Val 25	Leu	Thr	Ser	Tyr	Val 30	Leu	Pro
Thr	Asp	Pro 35	Gly	Gln	Thr	Thr	Asp 40	Ser	Ile	Gly	Leu	Arg 45	Leu	Leu	Glu
Val	Leu 50	Arg	His	Ala	Gly	Leu 55	Gly	Pro	Ala	Asp	Val 60	Gly	Ala	Cys	Val
Ala 65	Ser	Ser	Val	Val	Pro 70	Gly	Val	Asn	Pro	Leu 75	Ile	Arg	Arg	Ala	Cys 80
Glu	Arg	Tyr	Leu	Tyr 85	Arg	Lys	Leu	Leu	Phe 90	Ala	Pro	Gly	Asp	Ile 95	Ala
Ile	Pro	Leu	Asp 100	Asn	Arg	Tyr	Glu	Arg 105	Pro	Ala	Glu	Val	Gly 110	Ala	Asp
Arg	Leu 115	Val	Ala	Ala	Tyr	Ala	Ala	Arg	Arg	Leu	Tyr	Pro 125	Gly	Pro	Arg
Ser 130	Leu	Val	Ser	Val	Asp	Phe 135	Gly	Thr	Ala	Thr	Thr 140	Phe	Asp	Cys	Val
Glu 145	Gly	Gly	Ala	Tyr	Leu 150	Gly	Gly	Leu	Ile	Cys 155	Pro	Gly	Val	Leu	Ser 160
Ser	Ala	Gly	Ala	Leu 165	Ser	Ser	Arg	Thr	Ala 170	Lys	Leu	Pro	Arg	Ile 175	Ser
Leu	Glu	Val	Glu 180	Glu	Asp	Ser	Pro	Val 185	Ile	Gly	Arg	Ser	Thr 190	Thr	Thr
Ser	Leu	Asn 195	His	Gly	Phe	Ile	Phe 200	Gly	Phe	Ala	Ala	Met 205	Thr	Glu	Gly

Val Leu Ala Ala
210

<210> 60

<211> 639

<212> DNA

<213> Desulfovibrio vulgaris

<400> 60

```

atgacccagc atttcctgct gttcgacatc ggcaacacca acgtcaagat cggcatcgcg 60
gtggaaaccg ccgtgctgac ttcgtacgtg ctgcccacag accccggcca gacgaccgac 120
tccatcgggc tgcgcctgct ggaggtgctg cgccatgccg ggctgggacc ggcggacgtg 180
ggggcctgcg tggccagttc ggtggtgccc ggcgtcaacc cgctgatccg ccgcgcctgc 240
gaacgttacc tgtatcgcaa gctgctgttc gcccccggcg acatcgccat tccgctggac 300
aaccgctacg aacggcccgc cgaagtgggc gcggaccggc tgggtggcggc ctatgccgcc 360
cggcggctgt accccggccc ccggtcgctg gtatccgtgg atttcggcac cgccaccacg 420
tttgactgcg tggaaggggg tgcgtatctt ggtggtttga tctgtcccgg cgtgctgtcg 480
tccgccgggg cggtgtcgtc gcgcacggcc aagctgccgc gcatcagtct ggaagtggaa 540
gaggattcgc cggtcatcgg gcggtccacc accaccagcc tgaaccacgg cttcattttc 600
ggctttgccg ccatgaccga aggggtgctg gccgcctga 639

```

<210> 61

<211> 249

<212> PRT

<213> Pseudomonas putida

<400> 61

```

Met Ile Leu Glu Leu Asp Cys Gly Asn Ser Phe Ile Lys Trp Arg Val
  1             5             10             15

Ile His Val Ala Asp Ala Val Ile Glu Gly Gly Gly Ile Val Asp Ser
      20             25             30

Asp Gln Ala Leu Val Ala Glu Val Ala Ala Leu Ala Ser Val Arg Leu
      35             40             45

Thr Gly Cys Arg Ile Val Ser Val Arg Ser Glu Glu Glu Thr Asp Ala
      50             55             60

Leu Cys Ala Leu Ile Ala Gln Ala Phe Ala Val Gln Ala Lys Val Ala
      65             70             75             80

His Pro Val Arg Glu Met Ala Gly Val Arg Asn Gly Tyr Asp Asp Tyr
      85             90             95

Gln Arg Leu Gly Met Asp Arg Trp Leu Ala Ala Leu Gly Ala Phe His
      100            105            110

Leu Ala Lys Gly Ala Cys Leu Val Ile Asp Leu Gly Thr Ala Ala Lys
      115            120            125

Ala Asp Phe Val Ser Ala Asp Gly Glu His Leu Gly Gly Tyr Ile Cys
      130            135            140

Pro Gly Met Pro Leu Met Arg Ser Gln Leu Arg Thr His Thr Arg Arg
      145            150            155            160

Ile Arg Tyr Asp Asp Ala Ser Ala Glu Arg Ala Leu Ser Ser Leu Ser
      165            170            175

Pro Gly Arg Ser Thr Val Glu Ala Val Glu Arg Gly Cys Val Leu Met

```

180 185 190
 Leu Gln Gly Phe Ala Tyr Thr Gln Leu Glu Gln Ala Arg Val Leu Trp
 195 200 205
 Gly Glu Glu Phe Thr Val Phe Leu Thr Gly Gly Asp Ala Pro Leu Val
 210 215 220
 Arg Ala Ala Leu Pro Gln Ala Arg Val Val Pro Asp Leu Val Phe Val
 225 230 235 240
 Gly Leu Ala Met Ala Cys Pro Leu Asp
 245

<210> 62
 <211> 750
 <212> DNA
 <213> Pseudomonas putida

<400> 62
 atgattcttg agctcgattg cggtaacagc ttcatacaagt ggcgggtgat ccatgttgcc 60
 gatgctgtga ttgaagggtg tgggatcgtc gattccgatac aggcgctggt ggcggaagtg 120
 gctgcgctcg cttcagtgcg tctcacgggt tgccgtattg tcagtgtgcg cagcgaagaa 180
 gagaccgatg cgctttgcgc gttgattgct caggcatttg ccgtgcaggc gaaggttgcc 240
 caccctgtcc gtgaaatggc aggtgtgcgc aatggctatg acgactatca gcgcctgggt 300
 atggatcggt ggctggcggc gttgggggca tttcacctgg ccaagggcgc gtgcctgggtg 360
 attgacctgg gtaccgcggc aaaagcggac ttcgtttctg cagatggcga gcatcttggg 420
 ggctacatct gccacgggat gccattgatg cgtagccagc tgcgcactca caccgctcgg 480
 atccgctatg acgatgcctc cgcggagcgc gcattgagca gcttgtcacc aggtcgctcg 540
 actgtcgaag cggtagagcg cggttgcgta ttgatgctcc agggctttgc ctacacccag 600
 cttgagcagg ctctgtgtgct atgggggtgag gagttcaccg tgttcctcac tggcgggtgat 660
 gcgccactgg tgagggcggc cctgccacag gcgcgggtcg tgccctgacct ggttttcggt 720
 ggcctggcaa tggcttgtcc attggattga 750

<210> 63
 <211> 241
 <212> PRT
 <213> Thiobacillus ferrooxidans

<400> 63
 Met Ile Phe Ile Ala Val Gly Asn Thr Arg Thr Leu Leu Ala His Thr
 1 5 10 15
 His Asp Gly Val His Phe Asp Ser Val Ser Val Ala Thr Ser Leu Pro
 20 25 30
 Pro Thr Glu Ile Leu Gln Gln Pro Gly Leu Thr Trp Leu Ser Ala Pro
 35 40 45
 Asn Arg Glu Pro Val Ala Leu Gly Gly Val Val Pro Ala Ala Leu Ala
 50 55 60
 Ala Trp Arg Glu Ala Leu Ala Thr Ala Glu Val Arg Glu Pro Asp Pro
 65 70 75 80
 Gly Phe Phe Arg Arg Ala Val Pro His Asp Tyr His Pro Pro Glu Ser
 85 90 95
 Leu Gly Phe Asp Arg Arg Cys Cys Leu Leu Ala Ala Ala Met Asp Tyr
 100 105 110

Pro Gly Gln Asp Ser Ile Val Ile Asp Met Gly Thr Ala Ile Thr Ile
 115 120 125

Asp Leu Leu Ala Gly Gly His Phe Arg Gly Gly Arg Ile Leu Pro Gly
 130 135 140

Ile Ala Met Ser Leu Arg Gly Leu His Glu Gly Thr Ala Leu Leu Pro
 145 150 155 160

Glu Val Val Leu Asn Ala Pro Ala Glu Met Leu Gly Asn Asp Thr Ser
 165 170 175

Asn Ala Ile Gln Ala Gly Val Ile His Leu Phe Ala Asp Ala Leu Arg
 180 185 190

Gly Ala Ile Thr Asp Phe Arg Gln Tyr Ser Pro Gln Ala Arg Ile Leu
 195 200 205

Ile Thr Gly Gly Asp Ala Glu Arg Trp Gln Pro Gly Ile Ala Gly Ser
 210 215 220

Leu Tyr Gln Pro His Leu Leu Leu Arg Gly Phe Tyr Leu Trp Ile Arg
 225 230 235 240

Gly

<210> 64
 <211> 726
 <212> DNA
 <213> Thiobacillus ferrooxidans

<400> 64
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 catttcgaca gcgtcagcgt ggccacttcg ctgccaccca cggaaatcct gcagcagccc 120
 ggcttgacat ggctcagcgc gccgaaccgg gaaccgcgtc cgctgggcgg cgtcgtacct 180
 gcggcgcttg ccgcctggcg ggaagccttg gccacggcag aggtccgcga acccgacccc 240
 ggcttttttc gccgcgccgt gccgcacgac tatcatccgc cggaaagcct cggctttgac 300
 cgccgttgct gcctgctcgc cgccgccatg gactaccccg gccaggacag catcgtcatc 360
 gacatgggca ccgccatcac catcgacctg ctggctggcg gacatttccg gggcggacgc 420
 attctgccgg gtatcgccat gagcctgcgc ggtctgcatg aaggcacggc actccttcct 480
 gaagtcgtcc tgaacgcccc agcggaatg ctgggcaatg acaccagcaa cgccattcag 540
 gccgggggtca tccacctctt tgccgatgcc ctgcgcggcg ccattaccga ctttcgccag 600
 tacagcccc aggcacggat actgatcacc ggtggcgatg ccgaacgttg gcaaccgggc 660
 atcgctggta gcctgtacca gcccacatctg cttctgcgcg gcttttatct gtggatacgg 720
 ggatga 726

<210> 65
 <211> 242
 <212> PRT
 <213> Xylella fastidiosa

<400> 65
 Met Asn Asp Trp Leu Phe Asp Leu Gly Asn Ser Arg Phe Lys Cys Ala
 1 5 10 15

Ser Leu Arg Glu Gly Val Ile Gly Pro Val Thr Val Leu Pro Tyr Leu
 20 25 30

Thr Glu Thr Met Asp Ala Phe Ala Leu Gln Glu Leu Pro Arg Gly Arg
 35 40 45
 Val Ala Tyr Leu Ala Ser Val Ala Ala Pro Ala Ile Thr Thr His Val
 50 55 60
 Leu Glu Val Leu Lys Ile His Phe Glu Gln Val Gln Val Ala Ala Thr
 65 70 75 80
 Val Ala Ala Cys Ala Gly Val Arg Ile Ala Tyr Ala His Pro Glu Arg
 85 90 95
 Phe Gly Val Asp Arg Phe Leu Ala Leu Leu Gly Ser Tyr Gly Glu Gly
 100 105 110
 Asn Val Leu Val Val Gly Val Gly Thr Ala Leu Thr Ile Asp Leu Leu
 115 120 125
 Ala Ala Asn Gly Cys His Leu Gly Gly Arg Ile Ser Ala Ser Pro Thr
 130 135 140
 Leu Met Arg Gln Ala Leu His Ala Arg Ala Glu Gln Leu Pro Leu Ser
 145 150 155 160
 Gly Gly Asn Tyr Leu Glu Phe Ala Glu Asp Thr Glu Asp Ala Leu Val
 165 170 175
 Ser Gly Cys Asn Gly Ala Ala Val Ala Leu Ile Glu Arg Ser Leu Tyr
 180 185 190
 Glu Ala His Gln Arg Leu Asp Gln Ser Val Arg Leu Leu Leu His Gly
 195 200 205
 Gly Gly Val Ala Ser Leu Leu Pro Trp Leu Gly Asp Val Val His Arg
 210 215 220
 Pro Thr Leu Val Leu Asp Gly Leu Ala Ile Trp Ala Ala Val Ala Ala
 225 230 235 240
 Asn Val

<210> 66
 <211> 729
 <212> DNA
 <213> Xylella fastidiosa

<400> 66
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 ggtgtgattg gtcctgtaac gggttttgccg tacttaacag agaccatgga cgcgtttgcg 120
 ttacaggagc taccacgtgg tcgtgtggct tacttggcga gtgtcgctgc tccggctatt 180
 actacacatg tgctcgaagt attaaaaatc cacttcgagc aagtcaggt ggctgcaacc 240
 gtcgctgcat gtgccggagt acgaattgcc tatgctcacc cggaacgttt tggagtggat 300
 aggttcttag cgttgcttgg ttcgtatggt gagggcaatg tcctggtagt ggggtgctggg 360
 acagcattga ctattgattt gttggctgcc aatggttgtc atctcgagag gcgtatcagt 420
 gcttcaccga cattgatgcg ccaagcggtg catgcacgcg cgagcaact cccctcagt 480
 ggtgggaact acttgaggtt tgcggaagat acagaggatg cgttggtgtc aggggtgcaat 540
 ggtgcagcgg tggcattgat cgaacgtagc ctgtatgagg cacatcaacg tttggaccag 600
 tcggttcgat tattgttgca tgggtggaggt gtagcatctt tattgccttg gttgggcgac 660
 gtggtacatc gtcctacatt agtattggat ggcctggcga tctgggctgc cgttgcagct 720

aacgttttag

729

<210> 67

<211> 223

<212> PRT

<213> Helicobacter pylori

<400> 67

Met Pro Ala Arg Gln Ser Phe Thr Asp Leu Lys Asn Leu Val Leu Cys
 1 5 10 15

Asp Ile Gly Asn Thr Arg Ile His Phe Ala Gln Asn Tyr Gln Leu Phe
 20 25 30

Ser Ser Ala Lys Glu Asp Leu Lys Arg Leu Gly Ile Gln Lys Glu Ile
 35 40 45

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<213> Artificial Sequence

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<223> Description of Artificial Sequence: plasmid, pAN329 and pAN330

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<213> Artificial Sequence

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<223> Description of Artificial Sequence: plasmid, pOTP72

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